DOES NOT CIRCULATE

9/9975

Arizona Medicine

JOURNAL OF ARIZONA MEDICAL ASSOCIATION

MEDICAL SOCIETY OF THE UNITED STATES AND MEXICO

Volume 17, Number 5 May, 1960

UNIVERSITY OF MICHIGAN
MAY 19 1960
MEDICAL LIBRARY

DARVO-TRAN™ *when anxiety intensifies pain*

(dextro propoxyphene and acetylsalicylic acid with phenaglycodol, Lilly)

Darvo-Tran adds the tranquilizing effects of Ultran® to the established analgesic advantages of Darvon® and A.S.A.®.

Usual Dosage: 1 or 2 Pulvules® three or four times a day.

Ultran® (phenaglycodol, Lilly)
Darvon® (dextro propoxyphene hydrochloride, Lilly)
A.S.A.® (acetylsalicylic acid, Lilly)

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA, U.S.A.

020408

69TH ANNUAL MEETING SCOTTSDALE, ARIZONA
MAY 4, 5, 6, 7, 1960

one bridge player has epilepsy...

even his fellow players might not know—if his seizures are adequately controlled with medication Seizures can be adequately controlled in well over 90 per cent of patients, who can then lead normal lives.[1]

for enhanced control of seizures

DILANTIN® SODIUM KAPSEALS *time tested—clinically proven in...* ***grand mal and psychomotor seizures.*** *"It* (DILANTIN) *is one of the few useful anticonvulsants in which oversedation is not a common problem when full therapeutic doses are employed. Also, it is effective in treating all types of seizures except petit mal."*[2] DILANTIN Sodium *(diphenylhydantoin sodium, Parke-Davis) is available in several forms including Kapseals of 0.03 Gm. and of 0.1 Gm. in bottles of 100 and 1,000.*

other members of THE PARKE-DAVIS FAMILY OF ANTICONVULSANTS

for grand mal and psychomotor seizures: PHELANTIN® Kapseals *(Dilantin 100 mg., phenobarbital 30 mg., desoxyephedrine hydrochloride 2.5 mg.), bottles of 100.* ***for the petit mal triad:*** MILONTIN *(phensuximide, Parke-Davis) Kapseals, 0.5 Gm., bottles of 100 and 1,000; Suspension, 250 mg. per ¼ cc., 16-ounce bottles.* CELONTIN Kapseals *(methsuximide, Parke-Davis) 0.3 Gm., bottles of 100.*

LITERATURE SUPPLYING DETAILS OF DOSAGE AND ADMINISTRATION AVAILABLE ON REQUEST.

Bibliography: *(1) Maltby, G. L.:* J. Maine M. A. 48:257, 1957. *(2) Bray, P. F.:* Pediatrics 23:151, 1959.

2520

PARKE, DAVIS & COMPANY • DETROIT 32, MICHIGAN PARKE-DAVIS

Arizona Medicine

JOURNAL OF ARIZONA MEDICAL ASSOCIATION

MEDICAL SOCIETY OF THE UNITED STATES AND MEXICO

May, 1960 Vol. 17, No. 5

Table of Contents

ORIGINAL ARTICLES

SOLITARY PULMONARY NODULES 261
L. Henry Garland, M.D.

THE SURGICAL ABDOMEN IN PREGNANCY 267
Donald W. deCarle, M.D.

DIAGNOSIS AND TREATMENT OF DISEASES OF THE PARATHYROID GLANDS – Part III 274
Sherwood E. Feinberg, M.D.

SYNERGISM BETWEEN MEPERDINE DEMEROL® AND GILA MONSTER VENOM. 280
Herbert L. Stahnke

HYPOXIA OF THE HEART MUSCLE 281

HIPOXIA del MIOCARDIO 281
Adolfo Flores Ortega, M.D.

EDITORIALS

REGRESSION IN THE TREATMENT OF MAMMARY CARCINOMA 283
Warfield M. Firor, M.D.

THE ARIZONA VIEW 284

LETTER TO THE EDITOR – Lorel A. Stapley, M.D. 284

LETTER TO THE EDITOR – Barry Goldwater 284

LETTER TO THE EDITOR – Andrew E. Ruddock 285

IN MEMORIAM

JOHN L. DONAHUE, SR., M.D. 286

JAMES HENRY ALLEN, M.D. 287

GUY PETER SLAUGHTER, M.D. 287

ARIZONA MEDICAL ASSOCIATION REPORTS

NEW PRESIDENT, LINDSAY E. BEATON, M.D. 289

BOARD OF DIRECTORS MEETING 290

BIOGRAPHICAL RECORDS 305

MEDICAL SOCIETY OF THE UNITED STATES AND MEXICO

CUARTO REUNION RESUME 307

FOURTH ANNUAL MEETING RESUME 307

TOPICS OF CURRENT MEDICAL INTEREST

DAILY POLLEN COUNT NOW AVAILABLE IN SALT RIVER VALLEY 309

AIR POLLUTION IN ARIZONA Robert D. Smith, Jr., M.A. 309

FLUOTHANE Fred Landeen, M.D. 311

REPRINTS

THE STATISTICAL INVESTIGATION OF SMOKING AND CANCER OF THE LUNG. 313
Joseph Berkson, M.D.

FUTURE MEDICAL MEETINGS AND POSTGRADUATE EDUCATION

ARIZONA HEART ASSOCIATION 50A

OGDEN SURGICAL SOCIETY 50A

109TH AMA ANNUAL MEETING ART WORKS EXHIBITION 50A

POSTGRADUATE SEMINAR 50A

P.G. ASSEMBLY OF SOUTH TEXAS 50A

CALENDAR OF NATIONAL & INTERNATIONAL MEETINGS 51A

REGIONAL SPRING AND SUMMER MEETINGS 52A

UNIVERSITY OF CALIFORNIA POSTGRADUATE PROGRAMS 52A

DIRECTORY

OFFICERS DIRECTORY 7A

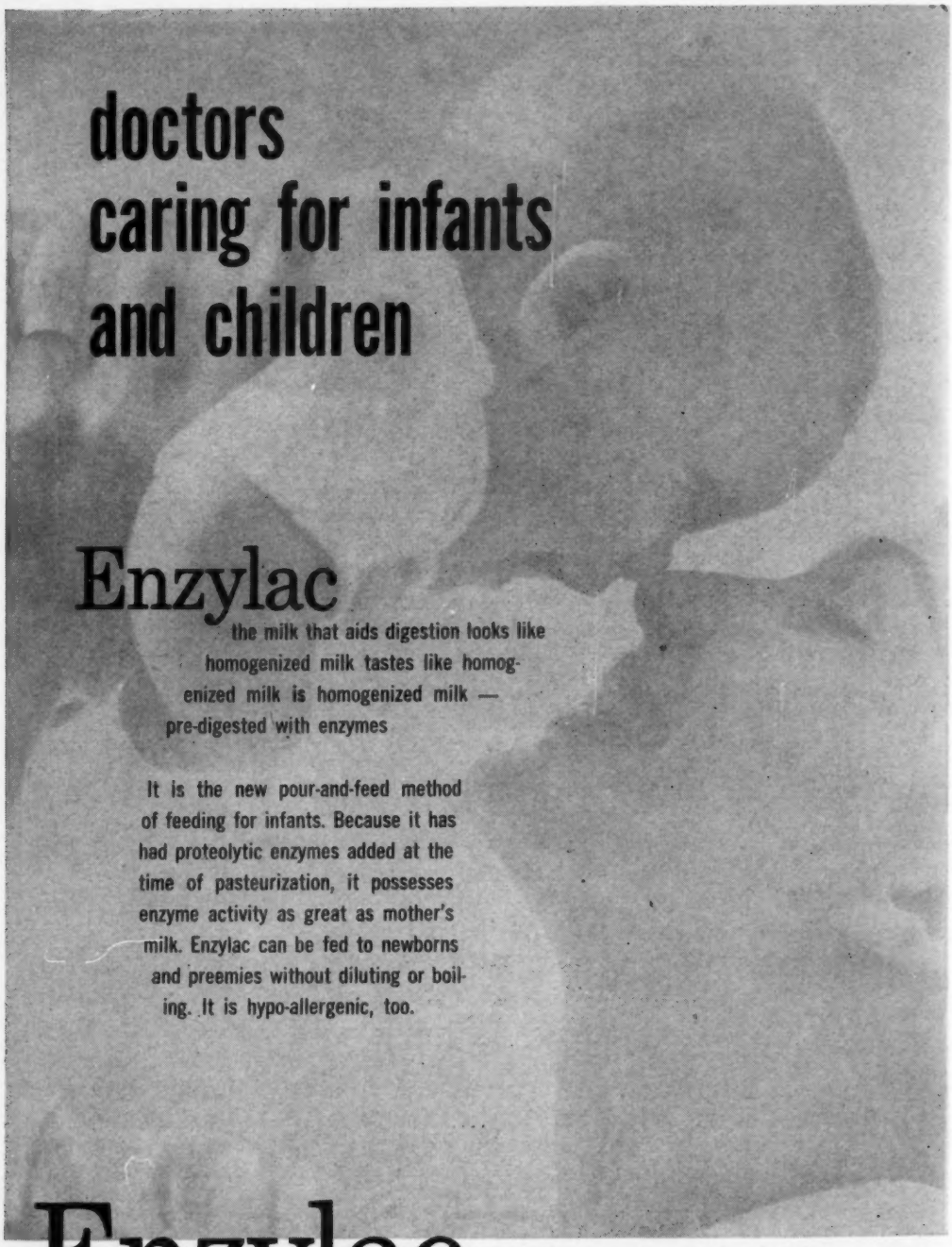
COMMITTEES 7A

WOMAN'S AUXILIARY 8A

INDEX TO ADVERTISERS 65A

Published monthly by the Arizona Medical Association, Inc. Business office at 1021 Central Towers Building, Phoenix, Arizona. Subscription $5 a year, single copy 50 cents. Entered as second class matter March 1, 1921, at Postoffice at Phoenix, Arizona, Act of March 3, 1879.

(The Editors of the Journal assume no responsibility for opinions expressed in the articles contributed by individual members.)


doctors
caring for infants
and children
Enzylac
the milk that aids digestion looks like homogenized milk tastes like homogenized milk is homogenized milk — pre-digested with enzymes
It is the new pour-and-feed method of feeding for infants. Because it has had proteolytic enzymes added at the time of pasteurization, it possesses enzyme activity as great as mother's milk. Enzylac can be fed to newborns and preemies without diluting or boiling. It is hypo-allergenic, too.

Enzylac available soon through local dairies so you can Rx a milk—not a medicine

Bibliography upon request to:
Medical Dairy Products, Inc.
Suite 812, Guaranty Bank Building
Phoenix, Arizona

produced by medical dairy products

Original Articles

ARIZONA MEDICINE

VOL. 17, NO. 5 MAY, 1960

Solitary Pulmonary Nodules*

A NEW METHOD FOR DIAGNOSIS OF SOLITARY LESIONS OF THE LUNG

L. Henry Garland, M.D.

Clinical Professor of Radiology
Stanford University Medical School
San Francisco

MR. CHAIRMAN and members, I am honored to be with your group. As one of your speakers said yesterday, these meetings are stimulating because you meet teachers from other parts of the country and find out what, if anything, they are up to.

Concerning this morning's talk on solitary nodules of the lung, I would like to make two points clear. First, anything I personally know about them is thanks to some hardworking surgeons and pathologists. Secondly, the best available treatment for localized cancer of the lung is prompt excision.

We estimate that about one quarter of primary bronchial carcinomas come to a doctor when they manifest themselves as a solitary nodule — that is to say, a nodule lying more or less within the lung parenchyma, up to about 6 cm. in diameter, and more or less circular or ovoid. This group represents potentially those with the best chance of cure.

Now the proportion of these solitary nodules that prove to be carcinoma varies with the sample studied. In unselected surveys it is about 3 per 100,000; and in selected surveys, say of male populations in veterans' hospitals, it runs up to 30 per 100,000. When you see a nodule, your immediate problem is to try to decide quickly: Is this probably cancer, or is it probably not cancer. Because if it is probably cancer, you ought to waste no time. In the past we have had a somewhat pessimistic attitude toward this matter, feeling that the only way to tell is to remove it. We encountered in two of our hospitals in San Francisco a sufficiently high morbidity, and believe it or not, in the last couple of years, a small mortality, removing benign nodules — this obviously is an inefficient method of differentiation. For that reason, we looked over our material to see if we could establish some means of non-surgical identification.

When Lady Macbeth was sleepwalking, the doctor said to a gentlewoman in her chamber, "You see, her eyes are open." The gentlewoman

*Abstracted from a presentation at Seventh Annual Cancer Seminar of the Arizona Division American Cancer Society January 22-24, 1959 — Phoenix.

replied, "Aye, but their sense is shut." Then Lady Macbeth comes in and says, "Yes, here's a spot. Out, damned spot! Out, I say." Well, this is what we used to say, too, "Out, damned spot," but it's not wise.

Now in a review I published recently covering about 2000 solitary nodules, the proportion of those malignant was about a quarter (25%). The range was 16 to 37. I was therefore surprised to read in U. S. Public Health Reports a year or two earlier that in a mass survey in Cleveland of almost 2,000,000 people in which 666 nodules were found, only 3% were malignant. Last year Taylor, from the Fitzsimmons Army Hospital, reported on 236 nodules, of which about 10% were malignant. The answer, of course, is that some are selected hospital groups, often with surgical orientation; and some are unselected, with young as well as old people.

Now, when you see a solitary pulmonary nodule on a roentgenogram, you ask: "Is this benign or malignant?" If it is benign, it may be any of the granulomas (In this part of the country, coccidiomas and histoplasmomas; in San Francisco, tuberculomas and coccidiomas; in Florida, tuberculomas and blastomycomas) or a circumscribed patch of pneumonitis or an abscess, a hamartoma or an adenoma. (Some adenomas are malignant, or at least metastasize, or are functioning carcinoids; but fortunately only about 10% of adenomas manifest themselves as solitary nodules; and in our experience, practically all of these were benign.) Cysts can manifest as solitary nodules; likewise sequestration.

Using the criteria to be outlined, we "fail" about 7% of the time and cannot classify the lesions as "benign" or "malignant".

ILLUSTRATIVE CASE REPORTS:

CASE 1. Here is a business man, age 54, with no pulmonary symptoms. A routine chest roentgenogram shows a sharply circumscribed nodule in the middle third of his right lung. He smokes modestly.

Tomograms showed central calcification. Tomograms were made on the same day as the routine films, as they should be. The examination ought to be completed at that time, just as you would complete your study of the blood pressure, or pulse, or what not, the first time you see the patient, if you are able to. This has all the earmarks of a benign lesion.

His tuberculin was found to be positive, his histoplasmin 3+, his coccidioidin 1+. So these did not help too much. However, the lesion is obviously sharply circumscribed and with central calcification. Therefore, it is a benign lesion, either a hamartoma or granuloma.

In spite of his wife's urging and my recommendation, he had it removed. And it was indeed a granuloma, type undetermined. A week later he developed atelectasis of the lower lobe and an infected effusion, which happens about 5% of the time. He had quite a bit of disability for about two months and thoracic scar pain. This, I think, is no longer necessary.

CASE 2. Here is a roentgenogram of one of our janitors at the hospital. A routine chest x-ray shows a right paratracheal opacity, smooth, oval; in a heavy density film it has some calcium. His tuberculin is positive. He lives in a poor part of town. He is entitled to have or have had tuberculosis. He weighs 250 pounds and has no symptoms.

He saw a Chief Surgical Resident, who told him he might have a cancer there. This is true it might be a thymoma, lymphoma or many things. So he urged him to have it operated upon, but the fellow refused.

He went home and brooded on this potential cancer for about four months, increasing his alcohol intake to quite a respectable degree. He finally lost his job on account of the latter, and then he agreed to hospitalization.

A roentgenogram made about four months after the initial film shows, if anything, the density to be a little smaller. This lesion obviously has not increased in size. It has calcium in it, and it's probably a mass of tuberculous nodes. But he would have an operation now.

It was indeed a tuberculous node, which broke at operation. He got a tuberculous mediastinitis and had a very stormy time. He then slowly got back on his feet but with persistent pain in his right arm. And he is now a professional welfare client. Can't work. His right arm hurts him, his chest hurts him, and so forth.

CASE 3. This is a fireman, aged 40. This fireman had his annual medical examination and was found to have a nodule in the left upper lung field. It has partly fuzzy borders, but the lateral border is sharp. There are streaks going to the hilum. The previous films had been lost. Stereoscopic films show that he has other opaci-

ties in this area, some of them with calcium. So this is not a solitary nodule. He saw a very good young doctor, who told him, "Now look, you're 40, you've been smoking heavily for 25 years. You must have this out quickly because this must be a tumor."

So he was operated on (his tuberculin, incidentally, was positive); and on attempting to remove this segment of the left upper lobe, they ran into trouble. Either the planes of cleavage were poor, or there was some other trouble; so they decided to remove the whole lobe. In removing the whole lobe, they nicked the left pulmonary artery accidentally. Well, he wasn't in too good shape. He died on the second postoperative day, of a right pulmonary embolus. The pathologic report of the tissue was 'tuberculoma'.

CASE 4. The next case concerns a middle-aged man. He had a little cough, no hemoptysis, no weight loss. His xrays showed disseminated bilateral nodular lesions, some with calcium. You would ask the man if he had done any mining. He had, for 30 years, in Nevada — hard rock mining. Does he have any sputum? Yes, he does, but it's negative for acid-fast or tumor cells. And this is just a localized area of progressive massive fibrosis such as you often see in silicosis. However, he was taken to surgery to have this tumor out. He died the next day. It was an area of fibrosis and silicosis.

At Letterman Army Hospital in 60 consecutive cases of solitary nodules, the operative morbidity was 10% — two bronchopleural fistulas, one persistent hemorrhage, one empyema, one pneumonia and two painful thoracic scars — there was no mortality.

Davis, in about 240 cases at Washington, had a 5% morbidity — six bronchopleural fistulas, seven empyemas, two reactivations of tuberculosis.

CASE 5. A few years ago a 40-year-old male was operated on at Letterman Army Hospital because of a left parahilar nodule. The frozen section was interpreted by a very good pathologist as carcinoma, so he had his left lung out. The fixed section was interpreted as normal lung tissue! The final diagnosis by the Army Institute of Pathology was thymoma. His subsequent course has been that of a benign thymoma.

CASE 6. We had a woman at the San Francisco Hospital with a right upper lobe nodule. Our impression was benign lesion. Surgeon's impression: tumor, primary, malignant. It shelled out nicely and was interpreted as inflammatory process. Fixed section was interpreted as anaplastic carcinoma. Final section showed a mesothelioma, benign. Subsequent course: benign.

CASE 7. A telephone operator of 30 had had a left lower lobe nodule for some years for which she refused exploration. We had followed her. We thought it was a adenoma. She had no trouble from it until her father died of bronchial cancer. Then she had pain. So it was removed. It was interpreted as oat cell carcinoma. We knew it couldn't be that. It had been there seven years. Then they changed the diagnosis to neuroblastoma; same pathologist, same hospital. And then Doctor Liebow changed it to carcinoid. Her subsequent course is that of a benign carcinoid, non-functioning.

The foregoing examples are presented just to remind you that histopathology is no more a refined science than is radiology.

Finally, surgical exploration is not always the answer.

CASE 8. A 45-year-old male had a silent ovoid mass in the right upper anterior chest, a nodule with fuzzy borders. This is bronchial cancer until proven otherwise. We coaxed the surgeons to explore him immediately which they did, and they found nothing. They closed him up.

We told them that they had missed it. They replied, "Well, we won't explore him again; he's too old." He died with a bronchial cancer in about 18 months. His lesion was well anterior, and by bad luck they had missed it at exploration. This is an additional reason, I think, for trying to make your mind up about these nodules ahead of time and going ahead with your surgical procedure, almost come what may.

When confronted with a solitary nodule on a chest roentgenogram, our method of diagnosis consists in an orderly and comparatively speedy three-step procedure based on *radiological, clinical* and *laboratory* examination. The first two steps often can be completed at the time of the patient's first visit; the third may require the lapse of a few days. The radiological step is listed first because most "coin" lesions are first detected as "silent" pulmonary roentgen shadows.

The radiological examination is completed in accordance with the suggestions outlined in the preceding paragraphs, the following specific

data being sought and recorded:

Is the opacity a true solitary pulmonary nodule, as defined?

Are its margins sharp, fuzzy, umbilicated or otherwise?

Do fine strands or linear opacities extend from the opacity to the hilum or parietal pleura; are there small adjacent or satellite nodules?

Is there calcium in the opacity; if so, is it central or marginal, laminated or "popcorn" like?

Is there any record of prior chest x-rays and, if so, what did these reveal? And on what dates?

Clinical information can often be obtained during the radiological study. Age, sex, symptoms relative to thoracic disease, and history of recent thoracic surgery is recorded. Enquiry is made concerning use of nasal oil medication, and residence in certain areas (such as the San Joaquin Valley, the Kansas-Missouri area, etc.)

The laboratory examination varies considerably in scope and timing, according to the circumstances present in the individual case, and the judgment of the referring physician. It may therefore be some time before it is possible to enter these particular data on the "3 step chart," and indeed it may be decided that such can be dispensed with.

The following points should then be recorded:

1. Radiological:

Margin (sharp, fuzzy, umbilicated, other)...
Strands (to pleura or hilum) or satellites...
Calcium (central or marginal, laminated, etc.) ....
Present at previous date . . . (and change, if any)....

2. Clinical:

Age (note especially if over 45)
Sex....
Symptoms or thoracic lesion or recent respiratory infection....
Recent thoracic surgery or history of tumor elsewhere....

3. Laboratory:

Skin or complement fixation tests for
tuberculosis....
coccidioidomycosis....
histoplasmosis....
Sputum tests (in selected cases) for
bacteria....
tumor cells....

If the radiological findings disclose a sharply marginated calcium, containing opacity and the patient is a female under 35 without symptoms, the great probability is that the nodule is a benign process (granuloma, cyst or benign tumor). Conversely, if the opacity has fuzzy margins and no calcification, and the patient is a male age 60, without symptoms or history of recent respiratory or cardiac disorder, the great probability is that the nodule is due to malignant process (primary bronchial carcinoma). There are, of course, degrees of variation in the clarity or decisiveness of the various criteria listed, but with practice, one can make reasonably terse and reproducible decisions, which will permit reaching a tentative and usually valid diagnosis.

Some of these criteria are discussed in the following section.

RADIOLOGIC CRITERIA

Sharpness of margin. The majority of granulomas, benign pulmonary tumors and cysts have relatively sharply defined borders; the majority of primary malignant tumors have relatively indefinite or "fuzzy" borders. This point is best appreciated in carefully made, fine-detail stereoscopic roentgenograms, and in tomograms. The nodule may present sharp margins on one projection (e.g., the lateral) but not in the other (e.g., the PA view – especially when the opacity is located dorsally in a thick chest). The sharpness is usually the "dominant" finding, and favors benignancy. "Nodules" that project as a "fan", or aggregation of linear opacities in one view are usually inflammatory; they are not true circumscribed lesions and are not considered in our series. Umbilication of one margin of the nodule has not proved a valuable clue in our experience; it has been seen in benign as well as malignant lesions.

Strands and nodules. Small linear densities connecting the nodular opacity with the pleura or with the hilum are more suggestive of inflammatory than neoplastic disease. However, small strands radiating out into the pulmonary parenchyma for a short distance occur more frequently with neoplasm than granuloma. Small satellite nodules may be seen on careful examination of stereoscopic or tomographic films. These may be associated with granulomas or primary pulmonary tumors (notably adenocarcinomas and bronchiolar carcinomas). Stereoscopy has per-

mitted the detection of multiple tiny metastases elsewhere in the lungs in some patients initially regarded as having solitary nodules.

Calcium. Nodules should be examined with care for the presence or absence of calcium. Slightly over-penetrated stereoscopic projections, oblique projections and tomograms are of value in determining this point. Calcification may be central or marginal, diffuse, nodular or laminated. In patients who do not have pulmonary calcification elsewhere (e.g., due to histoplasmosis, tuberculosis, etc.), the presence of calcium in a nodular lesion has been a reliable sign of benignancy in our experience. However, in a few patients with chronic or obsolete inflammatory disease, and associated pulmonary calcification, we have been deceived by nodular opacities with calcium in their periphery . . . assuming them at one time to be granulomas, but finding out that they were independent primary carcinomas arising contiguous with a calcified parenchymal focus.

O'Keefe, Good and McDonald[1] note that there is a difference between the demonstrability of calcium in the living patient, and in the surgical or post-mortem specimen. As happens with many other tissues, minute areas of calcification will not be demonstrable in vivo but are readily demonstrable in detailed radiography of the resected specimen. In their report of 135 benign lesions (granulomas, hamartomas, etc.) there was radiologic evidence of calcification in 36% in the preoperative roentgenograms, and in 50% in the resected specimen films. Conversely, in 72 malignant nodular lesions (mostly primary bronchial carcinomas), calcium was visible in only *1% of the preoperative roentgenograms* but in 13% of the resected surgical specimen roentgenograms. In their experience when the calcification was laminated or popcorn-like, the lesions were invariably benign; when it was central or punctate, one of the cases proved to be a malignant tumor.

Davis, Peabody and Katz[2] report that when a solitary nodule shows diffuse calcification, a large core of calcification, or laminated calcification, it usually proves benign. They state that it is their policy "to leave such a nodule alone unless it increases in size or shows other evidence of instability" and they endorse Carr's observation that while "calcium does not absolutely rule out malignancy, its presence within a malignant solitary nodule is so rare that the chance of its being benign is better than the probability of cure by resection if malignant."

Previous films. One of the useful steps in assessing the significance of a solitary nodule is the securing of such previous films and reports as are available, in order to determine the apparent duration and the presence of change in the nodule. An enlarging pulmonary nodule in an adult is more apt to be malignant than benign. On the other hand, a small percentage, perhaps 20%, of primary bronchial carcinomas, grew very slowly for the first few years of their demonstrable life and therefore absence of evidence of growth does not exclude neoplasm. A fairly dense nodule that has been present for over three years without change in size is almost always benign. Nodules that arise within a matter of months must be viewed with gravity, and steps taken for prompt identification.

Clinical criteria. Age. The frequency of primary bronchial carcinoma has been greatest, in our experience, between the ages of 50 and 70. It has been rare under the age of 40. Therefore, age has been a useful clue to the probable nature of a given nodular opacity. We have set 45 years as an arbitrary dividing line between relative infrequency and frequency of malignancy in solitary nodules. Davis et al., do not ascribe much value to age, but their own series of 215 patients with solitary nodules showed that 90% of the bronchial carcinomas were found in persons over 40 years of age.

Sex. In the individual case, sex is of course not a decisive factor. However, since bronchial carcinomas are approximately five times as frequent in males as in females, the sex of the patient does yield a slender clue.

Symptoms. The presence or absence of symptoms has proved useful in the identification of some solitary nodules. Five of the recent patients in our series had had preceding episodes of cough, fever, and other signs of lower respiratory infection. At the time of our examination their solitary nodules represented the residual areas of unresolved pneumonitis. In the light of their associated findings (age, sex, and so forth) the patients were observed and the opacities completely disappeared. In the earlier years of this study, four similar cases had been subjected to resection; the pathologic report in three was

chronic focal pneumonitis, and in one granuloma. Symptoms of chronic nasal catarrh proved of value in two patients; both admitted using oily nose drops, were under age 40 and the possibility of focal lipid pneumonitis was suggested; this proved correct on resection.

Previous surgery. In three patients with solitary nodules, a history was obtained of recent thoracentesis or pulmonary biopsy. The nodule proved to be a small hematoma in two cases. In the third, the lesion disappeared in about four weeks and was preseumed to have been of similar origin.

Laboratory Criteria. Laboratory examinations are obviously of limited value in the identification of solitary nodules. However, in persons under 40, they have proved useful at times. For example, in a soldier age 23 with a small circumscribed nodule containing a fleck of calcium, the tuberculin, coccidioidin and histoplasmin tests were all negative. The possibility of hamartoma was therefore suggested and this was confirmed at surgery. In other young patients (under 30) one of these three skin tests may be strongly positive and the other two negative, the lesion proving to be a granuloma of the type adumbrated by the positive skin test. Example: D. D., male, 29, with silent solitary nodule in right middle lung field, discovered in Army separation film. Tuberculin and histoplasmin skin tests negative. Coccidioidin positive. Had been a resident of the San Joaquin Valley. Diagnosis: Coccidioma. Operation disclosed same.

However, specific granulomas (e.g., coccidiomas) have been found despite negative skin tests. In some such cases, the complement fixation test was positive. Bacteriologic examination of the sputum has not proved of value, but could be if a superficial tuberculous lesion in a bronchus accompanied a tuberculoma. Cytologic study is usually negative with true "coin" lesions. Histologic examination of removed upper mediastinal or supraclavicular nodes was performed in a few cases and, as might be expected with this localized pulmonary lesion, was usually not informative.

You can put the data in chart form for use in hospital or office. You check off these various points. If you use the chart, it will make you *do* it; and it will aid in identifying many of these lesions rapidly.

These are the results in 105 consecutive cases. There were 65 that we labeled as "benign" by this 3-step method. We were right 63 times and wrong twice. There were 32 labeled "malignant." We were right 28 times and wrong four times. There were eight unclassified.

These were the errors. The two benign lesions were malignant tumors. This is a bad error, but two out of 65 isn't much higher than the histopathologic error. There were four we called malignant that were not, thank goodness. Three of them were granulomas, one benign. This is an error, but it is an error on the less dangerous side.

Now the eight unclassified cases teach me, personally, that if I cannot classify them, they ought to have immediate surgery, because half of those were malignant. Three were granulomas, and one was a benign tumor.

So don't be like Lady Macbeth. Don't say, "Out, damned spot." Study the patient and the xrays and you will save morbidity. And I think you will diagnose most of these nodules correctly.

References

O'Keefe, M. E., Good, C. A. & McDonald, J. R. Calcification in solitary lung nodules. Am. J. Roent. & Rad. Ther., 77, 1923. 1957.
Davis, E. W., Peabody, J. W. & Katz, S. The solitary pulmonary nodule. J. Thor. Surg., 32, 728-771, 1956.

"MARCH OF MEDICINE"

The practice of medicine in widely scattered regions of the United States will be the subject of a special hour-long documentary to be telecast over the NBC-TV network on Friday, May 27, at 8:30 p.m. (EST).

The program, to be telecast in color as well as black and white, is another in the award-winning "March of Medicine" series produced and sponsored by Smith Kline & French Laboratories in cooperation with the American Medical Association. Sequences were filmed in Alaska, Arizona, Louisiana, Pennsylvania and Wisconsin.

The Surgical Abdomen in Pregnancy*

Donald W. deCarle, M.D.

San Francisco, California

Signs and symptoms may be modified or masked during pregnancy. Every physician doing obstetrics must be ever mindful of the differential diagnosis. An important comment is made about use of x-ray during pregnancy.

IN APPROACHING any problem that involves the pregnant as opposed to the non-pregnant woman, whether it is surgical, medical, or obstetrical, there are certain generalities which must constantly be kept in mind. The first, and probably the most important to the surgeon, is the progressive displacement of the abdominal viscera by the growth of the pregnant uterus. This results in a constantly changing position and relationship of the various abdominal structures. It also causes varying degrees of discomfort and, at time, actual pain by stress and tension on certain tissue structures, such as muscles and ligaments. It becomes increased toward the latter part of pregnancy when uterine size and accompanying volume is at its greatest. Second, with our present knowledge, we have come to recognize an ever-enlarging number of modifications of physiological functions during pregnancy. This includes the so-called physiological anemias, the relative leukocytosis, the increased blood volume, and the multiple alterations in function of the glands of internal secretion, to mention a few examples. Finally, there are the many psychologic and emotional changes which cannot be overlooked in arriving at a diagnosis or carrying out treatment, either surgical or otherwise, in the pregnant female.

For simplification in the present discussion, the various complicating factors which could conceivably require intervention by abdominal surgery in the pregnant woman should be divided into two main groups. The first includes only those conditions which are directly related to the pregnancy itself. All other causative agents, including conditions coincidental to or accidentally associated with a pregnancy, are placed in the second of these two main groups.

GROUP I

Although this discussion is primarily concerned with the accidental complications found in the abdomen during pregnancy, there are several surgical conditions directly due to the pregnancy itself which should receive at least brief consideration, even among the general surgeons. By far the most important of these associated with early pregnancy is the so-called ectopic, or preferably tubal, gestation. It may manifest itself in so many ways that in the presence of any pelvic condition in a woman of childbearing age, even in the absence of a disturbed or modified menstrual period, the question of a possible ectopic pregnancy must be ever foremost in the mind of the examiner.

As opposed to the laboratory findings and those obtained by curettage which are helpful in a comparatively small per cent of these patients, the most valuable diagnostic procedure, in our opinion, is the posterior culpotomy. The presence of free blood in the abdomen can be demonstrated by this method. The adnexa can

*Presented before the 1959 meeting of the Ogden Surgical Society. (Recorded and published in conjunction with the Rocky Mountain Med. Jour.)

be palpated digitally and even fairly extensive pelvic surgery can be carried out through this same opening, as shown by Bradbury and others.

Surgery is the indicated treatment in all patients with tubal pregnancy. Salpingectomy and occasionally more extensive surgery may be necessary. An associated appendectomy should be avoided in the majority of these patients. The only two patients in this series, in which tuboplasty was attempted, as suggested by Stromme and Thompkins, required a second operation. One word of warning in connection with this complication, which cannot be too frequently emphasized, is the routine check of the Rh factor, previous to all transfusions in patients such as these. In all emergencies, when time does not permit, Rh negative Group O blood only should be employed.

Among the surgical complications of the late gestational period directly due to the pregnancy itself there is, on rare occasions, one associated with placenta accreta which should be called to the attention of the general surgeon. In the presence of a so-called precreta, the placental villae may actually perforate the uterine wall, involving the neighboring structures. There were none of these in this particular series, but two such cases were recently reported at the San Francisco Gynecological Society. In both patients, severe bladder symptoms appeared with an associated hematuria. Both required hysterectomy with partial removal of the bladder wall.

Two other conditions in this group, which do not warrant detailed discussion at this time, but with which anyone doing surgery should be conversant, are uterine rupture and abdominal pregnancy. Both are serious complications of pregnancy and both at times may become dire emergencies requiring immediate surgical interference. Of the former, there were but three in our series. All followed previous cesarean section. This complication is included primarily to call attention to the frequent presence of an associated hematuria. In a recent presentation, the late Dr. Cooley emphasized this finding as a definite diagnostic symptom. As to the second of these two complications, it is mentioned primarily to emphasize the importance of leaving the placental bed undisturbed at all times in the patient in whom this complication is found.

GROUP II

As opposed to the first major group, the second includes those surgical complications of the abdomen coincidental to the pregnancy. No attempt will be made to subdivide this group. It becomes rather a question of increasing difficulty in both diagnosis and treatment of many of the same complications in the more advanced stages of pregnancy and the early puerperium. This is probably true to a lesser degree in acute complicating lesions of the upper abdomen. Conditions such as acute gallbladder and perforated duodenal ulcer should be handled both as to diagnosis and treatment in a manner similar to that in the nonpregnant patient, according to Walker and Greany. However, according to these authors, one must keep continually in mind that all patients in this group have become so accustomed to various forms of abdominal discomfort, especially in late pregnancy, that they fail to complain of any real symptoms much later than the nonpregnant woman.

Acute appendicitis: Most authors agree that acute appendicitis is still the most common extra uterine complication requiring abdominal surgery. In spite of modern hospitals, radical surgery and antibiotics, Varney points out that disease of this organ still kills 217 persons monthly, according to the Bureau of Vital Statistics. Thus, all operators are uniform in their opinion that only early diagnosis and prompt surgical interference can avoid a serious outcome for both mother and child in the presence of an acute appendicitis. This requires constant suspicion of this condition, especially in the second and third trimesters and the early puerperium. Laboratory and x-ray studies may be of little help in obtaining a diagnosis. In the opinion of Bryan, who recently discussed acute appendicitis in pregnancy, the history, if carefully taken, is the most important factor in arriving at the correct diagnosis.

Douglas advises early surgical interference in the pregnant woman, especially in the third trimester, even when the signs and symptoms are relatively benign. Even though a certain number of patients may be operated needlessly, he feels the risk is insignificant compared to the possible tragedy which so frequently follows "procrastination and subsequent rupture of this organ."

Bryan, who agrees with this advice, notes a

41.6 per cent of patients with normal appendices who received surgery. On the other hand, Krieg, who collected 200 cases from four Detroit hospitals, calls attention to a 2 per cent maternal mortality with a definitely higher correct preoperative diagnosis. In the latter, the results of delay in surgical interference are obvious.

There were three patients in the group at Children's Hospital in San Francisco with a ruptured appendix. All occurred in the third trimester. All mothers and babies survived, although premature labor in one mother began within a matter of hours following surgery.

Bowel obstruction: Even more serious but fortunately far less frequent among complications requiring surgical interference during pregnancy, is intestinal obstruction. It increases in frequency in the advanced stages of pregnancy and early puerperium. This may be the result of tension on bands and adhesions produced by the enlarging uterus. Other causes include those which result in bowel obstruction also in the non-pregnant woman, such as volvulus, hernia, tumors and occasionally intussesception.

The main problem is in diagnosis. Presence of the gravid uterus is a definite handicap and may frequently result in serious delay in recognizing this condition. Auscultation and palpation become increasingly difficult in the presence of an abdomen filled in part or completely by the gravid uterus. The usefulness of x-rays as an added diagnostic aid also may be minimized. This can result in a delay which may even be fatal, especially when small bowel is involved. Six such cases were reported from the Martha Hague Hospital in 1952.

As in the non-pregnant, the symptoms of obstruction are much more profuond when the blood supply is involved. The case of one such patient was reported from the Sanford Hospital group. Within 12 hours of delivery, this patient complained of generalized abdominal pain with vomiting and distention. Symptoms of rapidly increasing shock were also present. The patient expired within a period of 48 hours in spite of treatment. Autopsy showed an extensive mesenteric thrombosis resulting from volvulus of an unusually elongated mesentery with a very narrow base.

Treatment of this condition is directed primarily toward release of the obstruction. It should be noted that one is definitely handicapped in the use of decompression methods in the patient well advanced in pregnancy. Von Geldern, in reporting some seven cases of intestinal obstruction, found that termination of the pregnancy was sufficient in three patients near term to relieve the acute symptoms without surgery. However, in two patients in this present series, all symptoms became accentuated and more apparent following delivery of the fetus. One patient operated twice, once early and again late in pregnancy, required a third laparotomy for relief from the same complication following delivery.

There were no fatalities in the group of cases reported from Children's. This can only be explained by early interference following the onset of symptoms.

Ovarian tumors: Tumors involving the ovary, discovered during early pregnancy, should be removed if solid or cystic and more than 10 cms. in diameter. The large majority of the latter which are of a size too small to be of surgical importance, are simple follicular or corpus luteum cysts. Many of these are either lost in the abdomen by the enlarging uterus or regress during the ensuing pregnancy. However, it should not be forgotten that torsion of the adnexa may occasionally occur with these same small tumors or even with a normal tube and ovary.

In Bell's experience, well over 80 per cent of ovarian tumors treated surgically are found to be cystic. The remainder are of the solid variety. Of the former, the most common in his opinion are cysts of the dermoid or pseudomucinous type. In the past five years at Children's Hospital, there were two out of the five dermoids correctly diagnosed preoperatively by x-ray evidence of calcium deposits.

It had been previously assumed that surgery within the first trimester, especially if the ovary containing the corpus luteum was removed, would be followed by spontaneous termination of the pregnancy. Recent accumulation of evidence has proved this assumption to be wrong. Placental function evidently begins much earlier in pregnancy than was previously thought, as shown by the discovery of chorionic gonadotropins in the patient's blood, even before the first period is missed.

Discovery of an ovarian tumor late in preg-

nancy can be treated by immediate removal. However, for the most part cesarean section, with removal at term, is the method to be preferred in patients with advanced pregnancy, should the tumor create a dystocia. If delivery of the fetus from below can be negotiated, then removal of such a tumor in the puerperium is probably even more satisfactory.

Although almost any kind of an ovarian tumor may be found associated with pregnancy, malignant neoplasms are fortunately rare. One such tumor was included in this series. It was first discovered at some 28 weeks of gestation. Because of its rapid growth, radical surgery was advised with sacrifice of the uterus and fetus. The patient, however, survived only six months following surgery.

Uterine fibroids: It was only some three decades ago that fibroids, discovered in early pregnancy, were treated by immediate myomectomy. In spite of heavy sedation, a high percentage of the patients thus operated, promptly miscarried. There was one such patient who was treated in this manner at Children's in the past five years. Fortunately, she was carried to term with no further complications, and was allowed to deliver spontaneously.

Of the seven patients in this group which came to surgery, one required an emergency laparotomy at 36 weeks with a preoperative diagnosis of acute appendicitis. On opening the abdomen, a pedunculated fibroid of the anterior uterine wall was found. It was gangrenous and surrounded by a layer of fibrin. Five of the remaining six were treated by supravaginal hysterectomy at the time of cesarean section. A similar hysterectomy was performed upon the sixth patient in the immediate puerperium. A large submucous fibroid filling the entire vagina, thought at first to be an inversion of the uterus, was found at the time of delivery of the placenta.

For the most part, myomata associated with pregnancy are left undisturbed. Even at cesarean section, only those which are in or near the uterine incision are removed, unless the uterus itself is to be sacrificed. It has become an accepted fact that with the rapid growth of these tumors during pregnancy, they undergo a high degree of degeneration. As a result, a large percent of myomata return to a size definitely smaller than that found preceding the pregnancy.

Vascular accidents: Of the least common but nevertheless serious intra-abdominal complications of pregnancy, are the so-called vascular accidents. They are the result in part of the increase in pressure which affects the intra-abdominal vessels in these patients during the latter months of pregnancy and the immediate puerperium. Although any abdominal vessel may be involved, hemorrhages resulting from rupture of aneurisms of the splenic and renal arteries are two of the most serious. Both are associated with unusually high maternal and fetal mortality. In a recent discussion of this subject, Thorp collected 117 cases of splenic artery rupture in pregnant women since 1900. Of these, 93.6 per cent occurred in the third trimester. What is most significant is that only five of this group survived and of the five, only two were diagnosed preoperatively.

Sperling, although admitting the infrequent preoperative diagnosis of this complication, suggests three possible criteria which might be helpful. Of these, the first is the upper left quadrant pain; the second is the presence of a systolic bruit over the palpable tumor mass; and the third is a pulsating filling defect in the greater gastric curvature on fluoroscopy.

Although even more infrequent than rupture of the splenic artery, such an accident in one of the renal arteries can be equally, if not more, serious. Of 11 cases involving this condition, Thorp reports the survival of but three patients. Only two of the three babies survived.

Not one of the 11 was diagnosed previous to surgery or autopsy. However, this author suggests that abdominal distention with increasing shock and a palpable retroperitoneal mass, confined to one flank, may be helpful. All patients in his group complained of intense pain in this same area.

The treatment in both these complications is immediate surgery. The uterus may be opened and emptied if it is sufficiently large to interfere with adequate exposure.

DISCUSSION

It becomes highly important to discuss briefly two phases intimately connected with the diagnosis and treatment of the acute abdomen in pregnancy. The first of these has to do with the choice of anesthesia and, the second, with x-ray as a diagnostic aid.

In the early half of the gestational period,

should an intra-abdominal surgical procedure be indicated, an induction dose of intravenous pentothal from 250-350 mgms. or more is used, depending on the size of the patient. The anesthesia may then be switched to small divided doses of intravenous demerol, 10 to 25 mgms., combined with nitrous oxide. Should the patient be in shock from blood loss, cyclopropane is the anesthesia of choice. As an alternative, however, following a small induction dose of 50-75 mgms. or more of pentothal, intravenous demerol in doses up to 200 mgms. or more combined with lorfan has been found to be both safe and effective.

In the latter half of pregnancy, spinal pontocaine, up to 8 or more mgms., given in 3 or more cc. of glucose and spinal fluid is to be preferred. The patient may then be tipped into Trendelenburg position and oxygen administered. By this method, comparatively little in the way of pressure drop has been found. Here again, demerol and lorfan may be helpful, should the procedure be unduly prolonged as by a preliminary section.

As a final word, there is no doubt that the opinion of a large majority of doctors is swinging away from the indiscriminate use of x-rays at any time during pregnancy. However, on discussing the problem of x-ray for diagnostic purposes in the pregnant patient with various doctors in that field, one is left with the feeling that maybe the crusade against its use has been too severe. All are unanimous in the opinion that its use during the first three months of pregnancy should be avoided entirely, with few or no exceptions. Conservative and judicious use any other time in pregnancy is permissible and probably inocuous.

UNITED STATES CENSUS PROBABLE GROWTH

Some figures released by the U.S. Bureau of Census relative to the probable growth of the 11 western states. Please note that the southwestern six states including Arizona are expected to grow 32.3% and the Pacific Northwest 21.9%, whereas the United States as a whole will grow 15.5% from 1960 to 1970.

State	1960	1970	Increase
Arizona	1,268,000	1,802,000	42%
California	15,273,000	20,296,000	33
Nevada	310,000	453,000	46
New Mexico	896,000	1,126,000	26
Utah	909,000	1,151,000	27
Colorado	1,762,000	2,197,000	25
SOUTHWEST			
TOTAL	20,418,000	27,025,000	32.3%
Oregon	1,923,000	2,433,000	27%
Washington	2,918,000	3,594,000	23
Idaho	664,000	771,000	16
Montana	671,000	755,000	13
Wyoming	338,000	392,000	16
NORTHWEST			
TOTAL	6,514,000	7,945,000	21.9%
11 Western States	26,932,000	34,970,000	30.2%

wherever there is inflammation, swelling, pain

VARIDASE®

Streptokinase-Streptodornase Lederle

BUCCAL Tablets

conditions for a fast & comfortable comeback

Host reaction to injury or local infection has a catabolic and an anabolic phase. The body responds with inflammation, swelling and pain. In time, the process is reversed. VARIDASE speeds up this normal process of recovery.

By activating fibrinolytic factors VARIDASE shortens the *undesirable phase*, limits necrotic changes due to inflammatory infiltration, and initiates the constructive phase to speed total remission. Medication and body defenses can readily penetrate to the affected site; local tissue is prepared for faster regrowth of cells.

In infection, the fibrin wall is breached while the infection-limiting effect is retained. In acute cases, response is often dramatic. In chronic cases, VARIDASE Buccal Tablets can stimulate a successful response to primary therapy previously considered inadequate or failing.

for routine use in injury and infection
...new simple buccal route

VARIDASE Buccal Tablets should be retained in the buccal pouch until dissolved. For maximum absorption, patient should delay swallowing saliva.

Dosage: One tablet four times daily usually for five days. When infection is present, VARIDASE Buccal Tablets should be given in conjunction with ACHROMYCIN® V Tetracycline with Citric Acid.

Each VARIDASE Buccal Tablet contains: 10,000 Units Streptokinase and 2,500 Units Streptodornase.

Supplied: boxes of 24 and 100 tablets.

1. Innerfield, I.: Clinical report cited with permission
2. Clinical report cited with permission

Lederle LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY
Pearl River, New York

FORCE INJURY
severe bruises ... swelling ... cleared by fifth day[2]

VARICOSE ULCER
15 years duration ... resolved with VARIDASE[1]

INFLAMMATORY DERMATOSIS
rapidly spreading rhus dermatitis healed within a week[1]

INFECTED LACERATION
marked reversal in 3 days... returned to school... closure advanced[1]

THROMBOPHLEBITIS
back on his feet in a week after recurrent episode[1]

REFRACTORY CELLULITIS
normal routine resumed after 4 days of VARIDASE[1]

Diagnosis and Treatment of Diseases of the Parathyroid Glands

PART III

Sherwood E. Feinberg, M.D.

Fort Huachuca, Arizona

IDIOPATHIC HYPOPARATHYROIDISM

THE IDIOPATHIC variety of parathyroid hypofunction is indeed uncommon. Whether the scarcity of cases is due to the actual rarity of the disorder or to lack of recognition by the medical profession is open to question(58). As of 1952, there were less than 150 reported cases of idiopathic hypoparathyroidism(58, 59, 163). While the condition is apt to present a diagnostic riddle, once diagnosed, it is amenable to treatment(143). As the name would indicate, the etiology of this disease is unknown. Several cases of congenital idiopathic hypoparathyroidism have been reported(80). Dietrich's, et al. analysis of 113 cases revealed age extremes of from two to seventy-two years at time of diagnosis(58). According to Van Ommen, there is no significant difference in sex incidence but the onset of symptoms is somewhat earlier in the female(173). Dietrich et al. state that the disorder is approximately twice as frequent in females as in males. Symptoms usually appear in the first or second decade and roughly 25% of the cases appear before the age of five years. The average time between onset of symptoms and therapy is slightly less than ten years(163). Three cases have been reported in siblings(167). The clinical features of idiopathic hypoparathyroidism are much like those of postoperative parathyroid hypofunction; however, the tetany may be more latent and trophic changes are more severe because of the chronicity of the disease(58). Chronic tetany is the most common manifestation of the disease, occurring in three-fourths of cases(163). Tetanic equivalents or manifest tetany may occur during menstrual periods which would suggest a relationship between estrogenic substances and parathormone(58, 137). Recurrent generalized convulsions formed part of the symptom complex in 52% of the cases reported by Steinberg and Waldron(163) while Dietrich et al. report a smaller percentage of patients with seizures. "Tetanic Equivalents" such as paresthesias, numbness, muscle cramps, laryngeal spasm, and bronchial spasm are not infrequent. Papilledema occurs in more than 10% of cases and when associated with convulsions may lead to a mistaken diagnosis of brain tumor. Frank psychosis may be the presenting symptom(143). Cataracts were present in 50% of the cases reported by Steinberg and Waldron and were present in 40 of 113 cases in Dietrich's review. The predominant occurrence of idiopathic hypoparathyroidism in the first and second decades does not seem to protect against cataract. The youngest patient reported by Steinberg to have cataracts was only twelve years of age(163). In the past, it was believed that the cataracts were due to convulsions with ciliary spasm, but the present feeling is that cataracts are due to low

serum calcium secondary to parathormone deficiency since cataracts occur in other conditions in which convulsions are absent yet serum calcium is low(58, 163). Symmetric calcification in the basal ganglia is a characteristic but not a constant finding in idiopathic hypoparathyroidism(58, 80, 163). There is characteristically a normal or increased bone density. However, a well documented case of idiopathic hypoparathyroidism has been presented with concomitant body demineralization and that author feels that skeletal demineralization will occur in cases of hypocalcemia of unusual severity(155). Dental defects occur in approximately one-third of cases(91, 173). The electrocardiogram characteristically shows a prolongation of the QT interval with flattening of the ST segment. Schulman and Ratner have reported a case of idiopathic hypoparathyroidism in which there was cardiac decompensation in the absence of demonstrable heart disease(155). The heart failure improved coincident with the rise in serum calcium. They feel that hypocalcemic heart disease is a definite clinical entity and ascribe it to an interference in cardiac neuromuscular transmission secondary to low values of serum calcium. Two cases have been reported of idiopathic hypoparathyroidism coexisting with pernicious anemia(96, 139). The association of fungus infections, mainly monilia, is fairly frequent(163,179). Although the coexistence of hypoparathyroidism and adrenal cortical insufficiency is rare, there have been several well documented cases(108, 131). It is felt that superficial moniliasis is the result of dystrophic lesions of the mucosa, skin, and nails, due to hypoparathyroidism, and that these lesions may precede chemical changes in the serum by a long interval(179). Examination of the urine and of the formed elements of the blood is uniformly negative. Constant findings are hypocalcemia and hyperphosphatemia, with levels of serum phosphorous as high as 13 mg.%. The alkaline phosphatase is characteristically normal. A low renal threshold for calcium is an occasional finding.

The following criteria should be satisfied for the diagnosis of the disease:

1. Low serum calcium level.
2. High serum inorganic phosphorous level. (Greater than 5 mg.% for adults and 7 mg.% for patients under 16 years.)
4. Normal bones on x-ray (to exclude infantile rickets or adult osteomalacia).
5. Chronic tetany.
6. Absence of a past history of thyroid surgery.
7. Absence of chronic intestinal dysfunction (steatorrhea).

The treatment of this disorder consists of therapy intended to increase serum calcium and reduce serum phosphorus. These will be discussed in the section on the treatment of hypoparathyroidism.

Only 5 of the 52 patients in Steinberg's and Waldron's series were dead at the time of the last follow-up. Thus, it would appear that, although the morbidity of hypoparathyroidism is great, death due to hormonal insufficiency is unusual. It is easily understandable then that few cases have come to autopsy. Of three cases examined at post mortem, two showed complete absence of parathyroid tissue while the third showed all the parathyroid glands to be replaced by fat(39, 59, 108).

PSEUDOHYPOPARATHYROIDISM (SEABRIGHT-BANTAM SYNDROME)

This condition is a familiar metabolic disease in which the parathyroids are seemingly normal in structure and function. However, the end organ response to parathormone is abnormal(56). The disease was first described by Albright in 1942(7). It is known as the "Seabright-Bantam Syndrome" because the male Seabright bantam has female feathering presumably due to failure of the feathers to respond to normal amounts of male hormone.

Pseudohypoparathyroidism presents a clinical picture of short stature, heavy set appearance, round face, mental retardation, and short stubby fingers. There is evidence of chronic parathyroid insufficiency as manifested by clinical and laboratory features. Tetany occurs in these patients in the absence of renal disease, steatorrhea, or osteomalacia. There is shortening of metacarpal and metatarsal bones. Soft tissue calcification involving the basal ganglia and subcutaneous tissues is frequent. Despite all this, the patients show little or no response to parathormone(61).

There have been five instances of familial incidence in approximately 35 cases culled from the world literature(175), and one of these involved both parent and child(156). Several cases have been reported with skeletal demineralization(132, 140).

This process must be differentiated from true hypoparathyroidism. Pseudohypoparathyroidism

is more likely to have calcium deposits in skin and basal ganglia than true hypoparathyroidism. The best way to differentiate these two disorders is the performance of the Ellsworth-Howard Test. In this test the intravenous administration of 200 units of parathyroid extract causes a varied phosphate diuresis. Patients with pseudohypoparathyroidism may exhibit a twofold increase in urinary phosphate excretion, while normal subjects show a fivefold to sixfold increase and patients with idiopathic or postoperative hypoparathyroidism show a tenfold or greater increase in urinary phosphate excretion under the conditions of the Ellsworth-Howard Test(182). The Ellsworth-Howard Test is not infallible. The test may not be valid because of the possible dissociation of phosphaturic and calcium mobilizing effect of parathyroid extract. Also, there is a normal diurnal variation of phosphorus excretion(118).

Both calciferol (Vitamin D2) and dihydrotachysterol (AT10) have been used successfully in the treatment of pseudohypoparathyroidism(95, 166).

PSEUDO-PSEUDOHYPOPARATHYROIDISM

This disease is extremely rare. As of 1956 there were only four reported cases in the world literature(8, 121, 144, 175).

These patients have some, but not all, of the stigmata of pseudo-hypoparathyroidism. The term pseudo-pseudohypoparathyroidism has been given the condition in which hypocalcemia (and resultant tetany and convulsive symptoms) and hyperphosphatemia are absent but ectopic ossification, dyschondroplasia, short stature, and round facies are present. No calcification of the basal ganglia has been noted in this group.

TREATMENT OF HYPOPARATHYROIDISM

The treatment of hypoparathyroidism consists of almost indefinite substitution therapy aimed at maintaining serum calcium and phosphorus at normal levels. Adequate management demands close cooperation between patient and physician. Substitution therapy involves a rigid therapeutic program which may include dihydrotachysterol (AT10), Vitamin D. calcium, aluminum hydroxide gel (to bind phosphorus), probenecid (Benemid) (to promote excretion of phosphorus), hydrochloric acid (to aid absorption of calcium), thyroid substances, sedatives, and a diet low in phosphorus (63).

The use of parathormone would appear to be a simple all-inclusive method of substitution therapy for this disorder; however, it is not practical to use the hormone over long periods of time since antihormones and allergic reactions to the foreign protein soon render the present commercial preparations valueless. The physician, therefore, must use agents which will increase calcium absorption from the diet(29).

Acute hypocalcemia should be treated with intravenous calcium chloride or calcium gluconate. However, one should institute a therapeutic regimen on a long term basis at the onset of acute calcium deficit. Caution must be exercised in the use of intravenous calcium in hypoparathyroid patients on digitalis because of the danger of cardiac arrest(30).

The patient must attempt to follow his disease in much the same fashion as a patient with diabetes mellitus. After serum calcium and phosphorus have been brought to normal levels, the patient may take over the major responsibility of treatment and the Sulkowitch Test is convenient for this purpose. If an early morning urine shows zero precipitate, then calcium is low and medication should be increased. A one plus indicates good control. A three plus indicates overtreatment and dosages should be decreased (36).

The Sulkowitch Test, while it is the best method for home control, is not ideal. Cases have been reported with Sulkowitch urine precipitates within normal range of density at calcium levels below 7 mg.%. A negative Sulkowitch has been reported in a patient with normal serum calcium(71, 143, 182).

Because of the potential error with the Sulkowitch test, and because of human frailty, the patient should periodically return to his physician for checks on serum calcium and phosphorus (71). In this regard, it is of interest that the low serum calcium value may be absent and an elevation of serum phosphorus to between 5 and 6 mg.% may be the only positive laboratory finding(103).

The dietary management of hypoparathyroidism should be directed at giving the individual food in which the ratio of calcium to phosphorus is fairly high (2:1-4:1). It is very important to be aware that most foods which have high calcium contents are also rich in phosphorus. Therefore, if one attempts to increase calcium absorption by a diet weighted with calcium rich

foods, the purpose is defeated since these foods are also rich in phosphorus, and a high calcium-phosphorus ratio in the diet is not attained (147). Foods with a high phosphorus to calcium ratio such as milk should be avoided(163). The intake of meat, fish, whole grain cereals, and dairy products should be limited because of their phosphorus content.

Calcium may be given in the form of calcium gluconate, calcium lactate, or calcium chloride. Calcium chloride may irritate the gastrointestinal tract if given in large amounts(147). Calcium lactate powder is a convenient preparation and may be given in a dose of four teaspoonsful a day dissolved in beverages other than milk. Each tsp. is equal to 3 gm. High calcium intake not only supplies calcium for absorption but also binds phosphorus as insoluble calcium phosphate which is passed in the stool. Therapy with calcium lactate powder costs less than one penny per day(36).

Dihydrotachysterol (AT10) is an effective therapeutic agent which has the disadvantage of being relatively expensive. The usual cost of therapy with this preparation is from $.55 to $2.20/day(36). AT10 is a derivative of irradiated ergosterol(149) and its effect is about midway between parathormone and Vitamin D2. Its major action is the augmented urinary excretion of phosphates, although a minor primary effect is to increase the absorption of calcium from the gut(163). It has more influence on the kidney than Vitamin D2 but it has less than parathyroid hormone. It has more effect on calcium absorption than parathormone but less than vitamin D2(36). It should be supplemented with oral calcium and low phosphorus diet in order to reduce the effective dosage(163). The possibility of dangerous hypercalcemia caused by this medication must be kept in mind(2). The usual dosage is 2 to 8 capsules/day. Two capsules are equal to 1 ml. liquid.

Calciferol (Vitamin D2) is a cheap and effective means of therapy. Its cost runs between three and twelve cents per day(36). This sterol also increases the urinary excretion of phosphorus and the intestinal absorption of calcium (147). It is supplied in 50,000 unit capsules and the usual dose is 1-4 capsules/day. It has been used successfully in the treatment of pseudohypoparathyroidism(95). Toxicity may occur from the use of Vitamin D2 probably due to high levels of ionized serum calcium. The symptoms are nausea and vomiting. If a patient shows poor control on Vitamin D2, the calcium intake should be increased because calcium will not cause toxicity as does D2. The dosage of D2 should be decreased at the same time.

Parathyroid implantation has been tried with only moderate success. Halsted and Pool, in 1907, first transplanted parathyroid tissue into a neighboring muscle(76, 134). Ogburn and Black feel that there is little critical evidence that such implants function; however, they believe that the procedure should be attempted in all cases in which parathyroid tissue is resected with the thyroid gland(128). More recently, Escamilla et al. have successfully transplanted cultured parathyroid tissue into several patients with surgical hypoparathyroidism. Their results were not spectacular yet apparent success in several of the patients followed for more than a year would indicate that this avenue of approach should be given further study(63).

BIBLIOGRAPHY

1. Abrams, M., Rutenberg, A. M., Lesses, M. F., and Gargill, S. L.: Hyperparathyroidism with nephrolithiasis – report of a case with a parathyroid tumor located within the thymus, New England J. Med., 241:401, 1949.
2. Adams, L. J.: Postoperative parathyroid tetany treated with dihydrotachysterol (AT-10), Can. Med. Assn. J., 42:373, 1940.
3. Albright, F.: A page out of the history of hyperparathyroidism, J. Clin. Endocrinal., 8:637, 1948.
4. Albright, F., Aub, J. C., and Bauer, W.: Hyperparathyroidism: a common polymorphic condition as illustrated by seventeen proved cases from one clinic, J.A.M.A., 102:1276, 1934.
5. Albright, F., Bauer, W., Ropes, M., and Aub, J. C.: Studies of calcium and phosphorus metabolism. The effects of the parathyroid hormone, J. Clin. Invest., 7:139, 1929.
6. Albright, F., Bloomberg, E., Castleman, B., and Churchill, E. D.: Hyperparathproidism due to a diffuse hyperplasia of all paraythyroid glands, rather than an adenoma of one; clinical studies on 3 cases, Arch. Int. Med., 54:315, 1934.
7. Albright, F., Burnett, C. H., Smith, P. H., and Parson, W.: Pseudo-hypoparathyroidism—an example of the "Seabright-bantam syndrome", Report of 3 cases, Endocrinology, 30:922, 1942.
8. Albright, F., Forbes, A. P., and Henneman, P. H.: Pseudo-pseudohypoparathyroidism, Tr. A. Am. Physicians, 65:337, 1952.
9. Albright, F. and Reifenstein, E. C., Jr.: The parathyroid glands and metabolic bone disease, Williams and Wilkins Co., Baltimore, 1948.
10. Albirght, F., Sulkowitch, H. W., and Bloomberg, E.: Further experience in the diagnosis of hyperparathyroidism; including discussion of cases with minimal degree of hyperparathyroidism, Am. J. Med. Science, 193:800, 1937.
11. Albright, H. L., and Kerr, R. C.: Primary hyperplasia of parathyroid glands. Report of a case coexistent with duodenal ulcer, J.A.M.A., 148:1218, 1952.
12. Dr. Anlyans discussion of paper by Goldman, Gordan, and Chambers: Ann. Surg., 146:407, 1957.
13. Anspach, W. E., and Clifton, W. M.: Hyperparathyroidism in children, Amer. J. Dis. Children, 58:540, 1939.
14. Atlas, D. H., Gaberman, P., and Eisenberg, H. L.: Syndrome of masked hyperparathyroidism, Ann. Int. Med., 44:1195, 1956.
15. Attie, J. N., and Perlmutter, M.: The diagnosis and treatment of hyperparathyroidism, New York St. J. Med., 54:2717, 1954.
16. Baird, I., Grainger, R., and Rowlands, B. D.: Hyperparathyroidism due to parathyroid adenoma, Brit. J. Surg., 42:140, 1954.
17. Bartter, F. C.: The parathyroids, Ann. Rev. Physiol., 16: 429, 1954.
18. Baylor, C. H., Van Alstine, H. E., Keutmann, E. H., and Bassett, S. H.: Fate of intravenously administered calcium. Effect on urinary calcium and phosphorous, fecal calcium, and calcium-phosphorous balance, J. Clin. Invest., 29:1167, 1950.
19. Beard, D. F., and Goodyear, W. E.: Hyperparathyroidism and urolithiasis, J. Urol., 64:638, 1950.
20. Bell, G. O., and Bartels, E. C.: Postoperative parathyroid tetany, Lahey Clin. Bull., 7:105, 1951.
21. Berne, C. J.: Discussion of paper by Jarvis, Sanderson, and Coe, Am. J. Surg., 94:292, 1957.
22. Black, B. M.: Hyperparathyroidism, Am. Lect. Series, Charles C. Thomas, Springfield, Ill. 1953.
23. Black, B. M.: Surgical aspects of hyperparathyroidism,

Surg. Gynec. and Obst., 87:172, 1948.
24. Black, B. M.: Surgical treatment of hyperparathyroidism, S. Clin. North America, 32:1031, 1952.
25. Black, B. M., and Haynes, A. L.: Intrathyroid hyperfunctioning parathyroid adenomas, Proc. Staff Meet. Mayo Clin., 24:408, 1949.
26. Black, B. M., and Sprague ,R. G.: Hyperparathyroidism due to diffuse primary hypertrophy and hyperplasia of parathyroid glands, Proc. Staff Meet. Mayo Cl., 22:73, 1947.
27. Black, B. M., and Zimmer, J. F.: Hyperparathyroidism with particular reference to treatment, Arch. Surg., 72:830, 1956.
28. Bogdanoff, M. D., Woods, A. H., White, J. E., and Engel, F. L.: Hyperparathyroidism, Am. J. Med., 21:583, 1956.
29. Bondy, P. K.: Hypocalcemic tetany, G. P., 11:76, 1955.
30. Bower, J. O., and Mengle, H. A. K.: Additive effect of calcium and digitalis: warning with report of 2 deaths, J.A.M.A., 106:1151, 1936.
31. Boyd, J. D., Milgram, J. E., and Stearns, G.: Clinical hyperparathyroidism, J.A.M.A., 93:684, 1929.
32. Brenizer, A. D., Jr.: Primary Hyperparathyroidism, Ann. Surg., 141:722, 1955.
33. Brewer, L. A. III: The occurrence of parathyroid tissue within the thymus; report of 4 cases, Endocrinology, 18:397, 1934.
34. Bronk, D. W.: Synaptic mechanisms in sympathetic ganglia, J. Neurophysiol., 2:380, 1939.
35. Brush, B. E., Chase, W. E., and Block, M. A.: An evaluation of newer methods in the diagnosis of hyperparathyroidism, Arch. Surg. 71:342, 1955.
36. Buckwalter, J. A., Soper, R. T., Davies, J., and Mason, E. E.: Postoperative hypoparathyroidism, Surg., Gynec. and Obst., 101:657, 1955.
37. Burnett. C. H., Commons, R. R., Albright, F., and Howard, J. E.: Hypercalcemia without hypercalcuria or hypophosphatemia, calcinosis and renal insufficiency—A syndrome following prolonged intake of milk and alkali, New England J. Med., 240:787. 1949.
38. Butterworth, C. E., Hamilton, L. C., and Zheutlin, N.: Pseudo-hypoparathyroidism, Am. J. Med., 21:644, 1956.
39. Cantarow, A., Stewart, H. L., and Morgan, D. R.: Chronic idiopathic parathyroid tetany, Endocriniology, 24:556, 1939.
40. Carpenter, H. M., and Pautler, E. E.: Hyperparathyroidism with renal insufficiency: Report of a case confused with the Burnett syndrome, New England J. Med., 250:453, 1954.
41. Castleman, B.: Tumors of the parathyroid glands, Armed Forces Inst. Path. Sec. 4, Fasc. 15, Washington, D.C., 1952.
42. Castleman, B., and Hertz, S.: Pituitary fibrosis with myxedema, Arch. Path., 27:69, 1939.
43. Castleman, B., and Mallory, T. B.: Pathology of parathyroid glands in hyperparathyroidism: Study of 25 cases, Am. J. Path., 11:1, 1935.
44. Castleman, B., and Parris, E.; Case records of the Massachusetts General Hospital, New England J. Med., 232:253, 1945.
45. Chambers, E. L., Jr., Gordan, G., Goldman, L., and Reifenstein, E. C., Jr.: Tests for hyperparathyroidism: Tubular reabsorption of phosphate, phosphate deprivation and calcium infusion, J. Clin. Endocrin. and Metab., 16:1507, 1956.
46. Churchill, E. D.: The operative treatment of hyperparathyroidism, Ann. Surg., 100:606, 1934.
47. Churchill, E. D., and Cope, O.: The surgical treatment of hyperparathyroidism, Ann. Surg., 104:9, 1936.
48. Churchill, E. D., and Cope, O.: Parathyroid tumors associated with hyperparathyroidism; 11 cases treated by operation, Surg., Gynec. and Obst., 58:255, 1934.
49. Coburn, D. E.: Severe osteitis fibrosa cystica with parathyroid tumor, Am. J. Surg., 66:252, 1944.
50. Collip, J. B.: The extraction of a paraythyroid hormone which will prevent or control parathyroid tetany and which regulates the level of blood calcium, J. Biol. Chem., 63:395, 1925.
51. Cope, C. L.: Base changes in alkalosis produced by treatment of gastric ulcer with alkalis, Clin. Sc., 2:287, 1936.
52. Cope, O.: Surgery of hyperparathyroidism: The occurrence of parathyroids in the anterior mediastinum and the division of the operation into two stages, Ann. Surg., 114:706, 1941.
53. Cope, O., Culver, P. J., Mixter, C. G., Jr., and Nardi, C. L.: Pancreatitis, a diagnostic clue to hyperparathyroidism, Ann. Surg., 145:857, 1957.
54. Crawford, D. J. M., Stefanelli, J., and Alvarez, A. F.: Three unusual cases of hyperparathyroidism, Brit. J. Surg., 44: 193, 1956.
55. Crawford, J. D., Osborne, M. M., Jr., Talbot, N., Terry, M. L., and Morrill, M. F.: Parathyroid glands and phosphorus homeostasis, J. Clin. Invest., 29:1448, 1950.
56. Cusmano, J. V., Baker, D. H., and Finby, N.: Pseudohypoparathyroidism, Radiology, 67:845, 1956.
57. DeQuervain, F.: Parastruma maligna aberrata, Deutsche Ztschr. F. Chir., 100:334, 1909.
58. Dietrich, F. S., Rice, M. L., Jr., and Luton, E. F.: Clinical manifestations of idiopathic hypoparathyroidism, Ann. Int. Med., 37:1052, 1952.
59. Drake, T. G., Albright, F., Bauer, W., and Castleman, B.: Chronic idiopathic hypoparathyroidism: Report of 6 cases with autopsy findings in one, Ann. Int. Med., 12:1751, 1939.
60. Ellsworth, R., and Howard, J. E.: Studies on the physiology of the parathyroid glands, Bull. Johns Hopkins Hosp., 55: 296, 1934.
61. Elrick, H., Albright, F., Bartter, I., Forbes, P., and Reeves, J. D.: Further studies on pseudohypoparathyroidism: Report of 4 new cases, Acta Endocrinol., 5:199, 1950.
62. Engel, M. B.: Elevation of serum mucoprotein by parathyroid extract, Fed. Proc., 10:39, 1951.
63. Escamilla, R. F., Kempe, C. H., Crane, J., Goldman, L., and Gordan, G. S.: Preliminary experiences with transplants of cultured parathyroid tissue in hypoparathyroidism, Ann. Int. Med., 46:649, 1957.
64. Feinberg, S. E.: Case report, Personal Communication, 1957.
65. Fitz, T. E., and Hallman, B. L.: Mental changes associated with hyperparathyroidism, Arch. Int. Med., 89:547, 1952.
66. Gargill, S. L., and Berlin, D. D.: Postoperative hypoparathyroidism, Trans. Am. Assoc. for Study of Goiter, 102, 1941.
67. Gilmour, J. R., Martin, W. J.: The weight of the parathyroid glands, J. Path. and Bact., 44:431, 1937.
68. Goldman, L.: Personal Communication, 1957.
69. Goldman, L.: Unusual manifestations of hyperparathyroidism, Surg., Gynec. and Obst., 100:675, 1955.
70. Goldman, L., Gordan, G. S., and Chambers, E. L., Jr.: Changing diagnostic criteria for hyperparathyroidism, Ann. Surg., 146:407, 1957.
71. Grant, D. K.: Papilledema and fits in hypoparathyroidism with report of 3 cases, Quart. J. Med., 22:243, 1953.
72. Greene, J. A., and Swanson, L. W.: Psychosis in hypoparathyroidism, Ann. Int. Med., 14:1233, 1941.
73. Grollman, A.: The role of the kidney in the parathyroid control of the blood calcium as determined by studies on the nephrectomized dog, Endocrinology, 55:166, 1954.
74. Gutman, A. B., Swenson, P. C., and Parsons, W. B.: Differential diagnosis of hyperparathyroidism, J.A.M.A., 103:87, 1934.
75. Haines, S. F.: Parathyroid insuffiency, Medical Clinics North America, 24:1019, 1940.
76. Halsted, W. S.: Hypoparathyreosis, status parathyreopriveus and transplantation of the parathyroid glands, Am. J. Med. Science, 134:1, 1907.
77. Handler, P., and Cohen, D. J.: Parathyroid extract and renal function, Am. J. Physiol., 169:188, 1952.
78. Hanes, F. M.: Hyperparathyroidism due to parathyroid adenoma with death from parathormone intoxication, Am. J. Med. Science, 197:85, 1939.
79. Hanson, A. M.: An elementary chemical study of the parathyroid glands of cattle, Mil. Surg., 52:280, 1923.
80. Harrison, H. E.: Idiopathic hypoparathyroidism, Pediatrics, 17:442, 1956.
81. Harrison, H. E., and Harrison, H. C.: The renal excretion of inorganic phosphate in relation to the action of vitamin D and parathyroid hormone, J. Clin. Invest., 20:47, 1941.
82. Heaton. L. D., and Cohn. R.: Surgery for hyperparathyroidism, West. J. Surg., 61:559, 1953.
83. Heinbach, W. F., Jr.: A study of the number and location of the parathyroid glands in man, Anat. Rec., 57:251, 1933.
84. Helfet, A. J.: A new conception of parathyroid function and its clinical application, Brit. J. Surg., 27:651, 1940.
85. Hellstrom, J.: Clinical experiences of 21 cases of hyperparathyroidism with special reference to the prognosis following parathyroidectomy, Acta Chir. Scandinav., 100:391, 1950.
86. Hellstrom, J.: Primary Hyperparathyroidism, Acta Endocrinol., 16:30. 1954.
87. Hellstrom, J.: The causes of unsuccessful or inadequate parathyroidectomy in hyperparathyroidism, Acta Chir. Scandinav., 112:79. 1956.
88. Henrie, J. N., Nelson, R. M., and Castleton, K. B.: Hyperparathyroidism, Am. Surgeon, 21:403, 1955.
89. Herbert, F. K., Miller, H. G., and Richardson, G. O.: Chronic renal disease, secondary parathyroid hyperplasia, decalcification of bone and metastatic calcification. J. Path. Bact. Lond., 53:161, 1941.
90. Hiatt, H. H., and Thompson, D. D.: The effects of parathyroid extract on renal function in man, J. Clin. Invest., 36: 557. 1957.
91. Hinrichs, E. H.: Dental changes in idiopathic juvenile hypoparathyroidism, Oral. Surg., Oral Med., Oral Path., 9:1102, 1956.
92. Hollinshead, W. H.: Anatomy of the endocrine glands, S. Clin. North America, 32:1115, 1952.
93. Houssay, B. A.: Relations between the parathyroids, the hypophysis and the pancreas, Harvey Lect., 31:116, 1936.
94. Howard, J. E., Hopkins, T. R., and Connor, T. B.: On certain physiologic responses to IV injection of calcium salts into normal, hyperparathyroid, and hypoparathyroid persons, J. Clin. Endocrinol., 13:1, 1953.
95. Howat. T. W., and Ashurst, G. M.: Pseudohypoparathyroidism, J. Bone and Joint Surg., Brit. Vol, 39-B:39, 1957.
96. Hurwitz, L. J.: Spontaneous hypoparathyroidism with megaloblastic anemia, Lancet, L:234, 1956.
97. James. P. R., and Richards, P. G.: Parathyroid Crisis, Arch. Surg., 72:553, 1956.
98. Janelli, D. E.: The parathyroid glands with special emphasis on surgical aspects, Surg., Gynec. and Obst., 102:105, 1956.
99. Jarvis, F. J., Sanderson, E. R., and Coe, R. C.: Hyperparathyroidism, Am. J. Surg., 94:292, 1957.
100. Kenny, A. D., Vine, B. G., and Munson, P. L.: Estimation of ratio of phosphaturic and calcium mobilizing activities in parathyroid extracts, Federation Proc., 13:241, 1954.
101. King, E. S. J., and Wood, B.: Parathyroid tumor with visceral metastases, J. Path. Bact. Lond., 62:29, 1950.
102. Kyle, L. H.: Differentiation of hyperparathyroidism and the milk alkali syndome, New England J. Med., 251:1035, 1954.
103. Kyle, L. H., Schaaf, M., and Meyer, R. J.: Unrecognized postoperative hypoparathyroidism, J. Clin. Endocrin. and Metabl., 14:579, 1954.
104. Lachman, A.: Hypoparathyroidism in Denmark, Acta Med. Scandinav., 121:1, 1941.
105. Lahey, F.: Parathyroid tumors, S. Clin. North America, 27:477, 1947.

106. Lee, C. M., Jr., McElhinney, W. T., and Gall, E. A.: Unusual manifestations of parathyroid adenoma, Arch. Surg., 71: 475, 1955.
107. Leifer, E., and Hollander, W.: Idiopathic hypoparathyroidism and chronic adrenal insufficiency: a case report, J. Clin. Endocrin. and Metab., 13:1264, 1953.
108. Leonard, M. F.: Chronic idiopathic hypoparathyroidism with superimposed Addison's disease in a child, J. Clin. Endocrinol., 6:493, 1946.
109. Levy, H. A.: Unusual clinical manifestations and chronic hypoparathyroidism, Medical Clinics North America, 31:243, 1947.
110. Reinhoff, W. F., Jr.; Lewis Practice of Surgery: Diseases of the parathyroid glands, W. A. Prior, Hagerstown, Maryland, Chapter II, 1957.
111. Loeb, J.: Physiological effects of calcium on an apparently new form of muscular irritability produced by solutions whose anions are liable to form insoluble compounds, Am. J. Physiol., 5:362, 1901.
112. MacGregor, M. E., and Whitehead, T. P.: Pseudohypoparathyroidism, Arch. Dis. Childhood, 29:398, 1954.
113. Mandl, F.: Therapeutischer versuch bei einem falle osteitis fibrosa generalisata mittels exstirpation eines epithelkorperchentumors. Wien. Klin. Wchnschr., 38:1343, 1925.
114. Martin, H.: The surgery of thyroid tumors, Cancer, 7: 1063, 1954.
115. Martin, L., and Canseco, J. D.: Pancreatic calculosis, J.A.M.A., 135:1055, 1947.
116. Mathier, H. G.: Hyperparathyroidism with normal serum calcium. Brit. M. J., 2:424, 1953.
117. McLean, F. C., and Hastings, A. B.: Clinical estimation and significance of calcium ion concentrations in the blood, Am. J. Med. Science, 189:601, 1935.
118. McNeely, W. F., Raisz, L. G., and LeMay, M.: Dyschondroplasia with soft tissue calcification and ossification and normal parathyroid function (Pseudo-pseudohypoparathyroidism), Am. J. Med., 21:649, 1956.
119. Merritt, E. A., and Caulk, R. M.: X-ray therapy of hyperparathyroidism, Radiology, 35:477, 1940.
120. Meyer, K. A., and Ragins, A. B.: Carcinoma of the parathyroid glands, Surgery, 14:282, 1943.
121. Miles, J., and Elrick, H.: Pseudo-pseudohypoparathyroidism: Report of a new case, J. Clin. Endocrinol., 15:576, 1955.
122. Mitchell, R. E., Jr., Tittle, R. C., and Bockus, H. L.: Nephrocalcinosis in patient with duodenal ulcer disease; report of case associated with parathyroid adenoma, Gastroenterology, 30:943, 1956.
123. Moehlig, R. C., and Steinbach, A. L.: Cortisone interference with calcium therapy in hypoparathyroidism, J.A.M.A., 154:42, 1954.
124. Munson, P. L.: Studies on the role of the parathyroids in calcium and phosphorus metabolism, Ann. New York Acad. Sc., 60:776, 1955.
125. Munson, P. L., Kenny, A. D., and Iseri, O. A.: Biological assay of calcium mobilizing hormone (CMH) bases on maintenance of serum calcium in parathyroidectomized rats, Fed. Proc., 12:249, 1953.
126. Norris, E. H.: Carcinoma of the parathyroid glands, Surg., Gynec., and Obst., Int. Abstr., 86:1, 1948.
127. Norris, E. H.: Parathyroid adenoma: study of 322 cases, Surg., Gynec., and Obst., Int. Abstr., 84:1, 1947.
128. Ogburn, P. L., and Black, B. M.: Primary hyperparathyroidism and papillary adenocarcinoma of the thyroid, Proc. Staff Meet. Mayo Cl., 31:295, 1956.
129. Oliver, W. A.: Acute hyperparathyroidism, Lancet, 2: 240, 1939.
130. Pemberton, J. D., Alexander, H. B., Kepler, E. J., and Broders, A. C.: Functional parathyroid tumors and hyperparathyroidism, Am. J. Surg., 65:157, 1944.
131. Perlmutter, M., Ellison, R. R., Norsa, L., and Kantrowitz, A. R.: Idiopathic hypoparathyroidism and Addison's disease, Am. J. Med., 21:634, 1956.
132. Peterman, M. G., and Garvey, J. L.: Pseudohypoparathyroidism, J. Lab. and Clin. Med., 33:1620, 1948.
133. Plumb, R. T.: Hyperparathyroidism: Ordinary diagnostic procedures, Calif. Med., 84:251, 1956.
134. Pool, E. H.: Tetany parathyroprivea, Ann. Surg., 46:507, 1907.
135. Pugh, D. G.: The roentgenologic diagnosis of hyperparathyroidism, S. Clin. North America, 32:1017, 1952.
136. Ranke, E. J., and Hollinger, P. H.: Paralysis of vocal cords following thyroidectomy; a study of its association with hypothyroidism and hypoparathyroidism, J.A.M.A., 158:543, 1955.
137. Reckendorf, H. K., and McGavack, T. H.: Surgical hypoparathyroidism precipitated by onset of the menopause, J. Clin. Endocrinol. and Metab., 16:668, 1956.
138. Reifenstein, E. C., Jr., and Howard, R. P.: The parathyroid glands, Glandular Physiology and Therapy, J. B. Lippincott, Philaedlphia, 1954.
139. Reisner, D. J., and Ellsworth, R. M.: Coexistent idiopathic hypoparathyroidism and pernicious anemia in a young girl, Ann. Int. Med., 43:1116, 1955.
140. Reynolds, T. B., Jacobson, G., Edmondson, H. A., Martin, H. E., and Nelson, C. H.: Pseudohypoparathyroidism: report of a case showing bony demineralization, J. Clin. Endocrin., 12: 560, 1952.
141. Richter, C. P., and Helfrick, S.: Decreased phosphate appetite of parathyroidectomized rats, Endocrinology, 33:349, 1943.
142. Rienhoff, W. F., Jr.: Surgical treatment of hyperparathyroidism, Ann. Surg., 131:917, 1950.
143. Robinson, K. C., Kallberg, M. H., and Crowley, M. F.: Idiopathic hypoparathyroidism presenting as dementia, Brit. Med. J., 2:1203, 1954.
144. Roche, M.: A case of pseudo-pseudohypoparathyroidism, J. Clin. Endocrinol., 15:964, 1955.
145. Rogers, H. M.: Parathyroid adenoma and hypertrophy of parathyroid glands, J.A.M.A., 130:22, 1946.
146. Rogers, H. M., Keating, F. R., Jr., Morlock, C. G., and Barker, N. W.: Primary hypertrophy and hyperplasia of parathyroid glands associated with duodenal ulcer, Arch. Int. Med., 79:307, 1947.
147. Rose, E.: Hypoparathyroidism, Clinics, 1:1179, 1943.
148. Rupp, J. J., and Paschkis, K. E.: Panhypopituitarism and hypocalcemic tetany in male, Ann. Int. Med., 39:1103, 1953.
149. Ryan, E. J., and McCullagh, E. P.: The use of AT-10 in chronic tetany, Ohio St. Med. J., 37:430, 1941.
150. Salveson, H. A., Hastings, A. B., and McIntosh, J. F.: The effect of the administration of calcium salts on the inorganic composition of the blood, J. Biol. Chem., 60:327, 1924.
151. Sandstrom, I.: On a new gland in man and several mammals, Upsal laharcforenings forhandlinger, 15:441, 1879-80.
152. Schiffrin, M. J.: Relationship between parathyroid and gastric glands in the dog, Am. J. Physiol., 135:660, 1942.
153. Schneider, H. O.: A case of hyperparathyroidism with unusual deformity of the thoracic cage, Ann. Int. Med., 39:357, 1953.
154. Schneider, R. W.: The diagnosis and treatment of hyperparathyroidism, Postgrad. Med., 12:293, 1952.
155. Schulman, J. L., and Ratner, H.: Idiopathic hypoparathyroidism with bony demineralization and cardiac decompensation, Pediatrics, 16:848, 1955.
156. Selye, H.: Textbook of Endocrinology, Acta Endocrinologica, Montreal, Canada, 1949.
157. Sheehan, H. L., and Summers, V. H.: The syndrome of hypopituitarism, Quart. J. Med., 18:319, 1949.
158. Smith, F. B., and Cooke, R. T.: Acute fatal hyperparathyroidism, Lancet, 2:650, 1940.
159. Snapper, I.: Parathyroid hormone and mineral metabolism, Bull. New York Acad. Med., 29:612, 1953.
160. Soffer, L. J.: Diseases of the Endocrine glands, Lea and Febiger, Philadelphia, 1951.
161. Soffer, L. J.: ACTH and cortisone: physiologic and clinical considerations, Medical Clinics North America, 36:791, 1952.
162. St. Goar, W.: Gastrointestinal symptoms as a clue to the diagnosis of primary hyperparathyroidism: A review of 45 cases, Ann. Int. Med., 46:102, 1957.
163. Steinberg, H., and Waldron, B. R.: Idiopathic hypoparathyroidism, Medicine, 31:133, 1952.
164. Stewart, G. S., and Bowen, H. F.: The parathyroid control of serum calcium independent of renal mediation, Endocrinology, 48:568, 1951.
165. Stewart, G. S., and Bowen, H. F.: The urinary phosphate excretion factor of parathyroid gland extracts: a hormone or an artifact? Endocrinology, 51:80, 1952.
166. Sussman, R. M., and Edinburg, A.: Chronic idiopathic hypoparathyroidism simulating cardiac asthma, New England J. Med., 256:734, 1957.
167. Sutphin, A., Albright, F., and McCune, D. J.: Five cases (three in siblings) of idiopathic hypoparathyroidism associated with moniliasis, J. Clin. Endocrinol., 3:625, 1943.
168. Swinton, N. W.: Postoperative parathyroid tetany, New England J. Med., 217:165, 1937.
169. Taylor, N. B., and Caven, W. R.: Observations upon the serum calcium after adrenalectomy, Am. J. Physiol., 81:511, 1927.
170. Thorek, P.: Anatomy in Surgery, J. B. Lippincott Co., Philadelphia, 1951.
171. Tillman, H. H.: A study of bone regeneration, Oral Surg., Oral Med., Oral Path., 9:1115, 1956.
172. Treusch, J. V.: Idiopathic hypoparathyroidism: report of an unusual case, Ann. Int. Med., 46:956, 1957.
173. Van Ommen, R. A.: Clinical manifestations of idiopathic hypoparathyroidism, Cl. Clin. Quart., 21:72, 1954.
174. Waife, S. A.: Parathyrotoxicosis — The syndrome of acute hyperparathyroidism, Am. J. Med. Science, 218:624, 1949.
175. Wallach, S., Englert, E., Jr., and Brown, H.: The syndrome of pseudo-pseudohypoparathyroidism, Arch. Int. Med., 98: 517, 1956.
176. Walton, A. J.: Surgical treatment of parathyroid tumors, Brit. J. Surg., 19:285, 1931.
177. Weiss, N.: Zur pathologie and pathologischen anatomie der tetanie, Wien. Med. Wchnschr., 33:683, 1883.
178. Weissman, I., Worden, J. P., and Christie, J. M.: Mediastinal parathyroid carcinoma with metastases, Radiology, 68: 352, 1957.
179. Whitaker, J., Landing, B. H., Esselborn, V. M., and Williams, R. R.: The syndrome of familial juvenile hypoadrenocorticism, hypoparathyroidism, and superficial moniliasis, J. Clin. Endocrinol. and Metab., 16:1374, 1956.
180. Wilder, R. M., and Howell, W. P.: Etiology and diagnosis of hyperparathyroidism, J.A.M.A., 106:427, 1936.
181. Williams, R. H.: Textbook of Endocrinology, Saunders, Philadelphia, Second Edition, 1955.
182. Wise, B. L., and Hart, J. C.: Idiopathic hypoparathyroidism and pseudohypoparathyroidism. Observations on the electroencephalogram in hypocalcemia, Arch. Neuro. and Psych., 68:78, 1952.
183. Wood, J. H., and Morris, K. A.: Severe tetany with laryngospasm and prolonged coma following thyroidectomy, Southern Surgeon, 15:705, 1949.
184. Woolner, L. B.: Pathologic diagnosis of primary hyperparathyroidism, S. Clin. North America, 1043, Aug., 1952.

Synergism between Meperdine (Demerol) and Gila Monster Venom

Herbert L. Stahnke

Director, Poisonous Animals Research Laboratory, Arizona State University
Tempe, Arizona

IT HAS been shown previously (Stahnke, 1956) that meperdine hydrochloride (Demerol *R*) (2) acts synergistically with the neurotoxic venom of the scorpion *Centruroides sculpturatus* Ewing. In the same paper it was postulated that since the venom of the Gila Monster, *Heloderma suspectum*, Cope, demonstrated neurotoxic properties meperidine may not be a desirable analgesic agent for such cases of venenation. This hypothesis was tested in the following manner:

Procedure: The same statistical design reported previously (Stahnke, 1956) was used. Rats were again the animals of choice. The LD50 was determined for lot 30.5E of *H. suspectum* venom taken by pipette from the *vestibulum oris* of live animals and lyophilized. The venom was reconstituted with distilled water to a concentration of 10 mg/ml. The LD50 of meperidine was determined previously (Stahnke, 1956). The effect of meperidine on the LD50 of the venom was then tested by the use of 50 mgm/kgm and 100 mgm/kgm as constants while the dosage level of the venom was varied. The same precautions were observed as reported previously (Stahnke, 1956).

Results: The data from all the tests are given below. The Da (first level dosage) is in mgm/kgm, as are also the LD50s and the Confidence Limits. In each case N = 4, R = 2, and K = 3.

Agents	Da	r-values	LD50	95% Confidence Limits
Venom only	2.80	0,0,3,4	9.50	6.7 to 13.4
Meperidine only	160.0	0,0,3,4	239.8	213.6 to 269.1
50 mg/kgm meperidine plus variable venom	2.80	0,2,4,4	5.65	4.0 to 7.99
100 mg/kgm meperidine plus variable venom	9.75	0,0,3,4	2.5	1.70 to 3.47

Discussion: The above data indicate that meperidine greatly increases the toxicity of *H. suspectum* venom; 50 mgm/kgm of meperdine causes a drop in the LD50 from 9.50 mgm/kgm to 5.65 mgm/kgm or causes the venom to be 1.68 times as toxic, while 100 mgm/kgm of meperidine changes the LD50 from 9.50 mgm/kgm to 2.5 mgm/kgm or 3.8 times as toxic. The synergistic action is even greater than demonstrated (Stahnke, 1956) for the venom of the scorpion *C. sculpturatus.*

Conclusion: Since the reaction of rats to *H suspectum* venom closely parallels that of man, the above data strongly suggests the contra-indication of meperidine as a therapeutic agent in conjunction with this type of venenation. The above data adds to the evidence that meperidine should be used with caution in the presence of any neurotoxic venom. This would include the venom of not only certain scorpions and the Gila monster, but also that of the Black Widow spider and rattlesnakes.

Literature Cited

Stahnke, Herbert L., 1956, Arizona Medicine, 13(6),:225-7.

(1)With the technical assistance of Frank A. Billingsley and Assistant Director A. E. Dammann.
(2)Demerol (R) hydrochloride received through the courtesy of Winthrop-Sterns, Inc.

Hypoxia of the Heart Muscle

An Experimental Study

Adolfo Flores Ortega, M.D.

Guadalajara, Jal.

HIPOXIA DEL MIOCARDIO

En cierto número de casos de enfermedades cianóticas congénitas del corazón así como en casos de nacimiento de la coronaria izquierda a partir de la pulmonar, la inversión de las ondas T en algunas derivaciones se atribuye a la perfusión del sistema coronario con una sangre pobremente oxigenada.

Con el deseo de estudiar experimentalmente esta alteración de la onda T hemos estado trabajando con un procedimiento quirúrigico que nos permite desviar la sangre venosa dentro de la aurícula izquierda, creando de esta manera un estado hipóxico en la circulación sistémica y consecuentemente en la red coronaria. Este procedimiento quirúrgico fué introducido por el autor en el estudio de las curvas de disociación de oxígeno cuando en tal punto se trabajaba en la Universidad de Chicago.

Mediante esta operación se pueden tener perros con una saturación de oxígeno arterial hasta de 35%, de acuerdo al tamaño de la fístula. Los cambios electrocardiográficos que hemos observado mediante estas fístulas veno-arteriales son los siguientes: a los pocos minutos de estar funcionando el shunt al voltaje de los complejos se abate; la onda T positiva se vuelve isoeléctrica para luego negativizarse; estos fenómenos los hemos seguido estudiando en algunos animales hasta 30 días después de la intervención y hemos visto que persisten; en otros casos en que hemos deshecho la fístula estas alteraciones desaparecen, es decir, los volta jes aumentan y las ondas T se positivizan, en otras palabras el trazo electrocardiográfico se normaliza. (Estos datos se refieren a las derivaciones D2, D3, y VF).

Podemos concluir por este estudio que la inversión de la onda T en casos de anomalias cardiacas congénitas cianóticas así como en casos de nacimiento de la arteria coronaria izquierda a partir de la pulmonar se debe a la perfusón del sistema coronario con sangre poco oxigenada.

IN A CERTAIN number of cyanotic congenital heart anomalies as well as in cases of left coronary artery taking origin from the pulmonary artery, the inversion of the T waves in some leads is attributed to the perfusion of the coronary system with a blood poorly oxygenated.

With the idea of studying experimentally this alteration of the T wave we have been working with a surgical procedure which allows us to divert the venous blood into the left auricle, creating in this way a hypoxic state in the systemic circulation and consequently in the coronary system. This surgical procedure was introduced by the author while working at the University of Chicago in the study of the oxygen dissociation curves.

By means of this operation one can have dogs with an arterial oxygen saturation down to 35% according to the size of the shunt. The electrocardiographic changes that we have observed by means of this veno-arterial shunt are the following: after few minutes of the shunt being open the voltage of the curves comes down; the T wave is changed from positive to isoelectric to become later on frankly negative; we have followed these in some animals up to 30 days after the operation and we have noticed that they persist; in some other cases in which we have undone the shunt these alterations disappeared. In other words, the voltages increase and the T waves become positive, i.e. the electrocardiographic curves return to normality. (These data are referred to leads D2, O3, and VF).

We may conclude by this study that the alteration of the T wave in cases of cyanotic congenital anomalies of the heart as well as in cases of a pulmonic left coronary artery, is due to the performance of the coronary system with an under-saturated blood.

The first specific aldosterone-blocking agent...

ALDACTONE™

effectively extends the medical control of edema or ascites.
It introduces a new therapeutic principle in the treatment of...

CONGESTIVE HEART FAILURE · HEPATIC CIRRHOSIS
THE NEPHROTIC SYNDROME · IDIOPATHIC EDEMA

ALDACTONE introduces a new class of therapeutic agent, the aldosterone-blocking agent providing:

satisfactory relief of resistant or advanced edema even when all other agents, alone or in combination, are ineffective or are only partially effective.

A New Order of Therapeutic Activity

ALDACTONE acts by blocking the effect of aldosterone, the principal mineralocorticoid governing the reabsorption of sodium and water in the distal segment of the renal tubules.

By so doing Aldactone establishes a fundamentally new and effective approach to the control of edema or ascites, including edema resistant or unresponsive to conventional diuretic agents.

Further, because of its different site and mode of action in the renal tubules, Aldactone has a true, highly valuable synergistic activity when used with a mercurial or thiazide diuretic.

What Physicians May Expect of Aldactone

It is fully expected that Aldactone will change present medical concepts of the therapeutic limitations of managing edema. Many patients living in a greater or lesser state of edematous invalidism can now be edema-free. To others, gravely ill, Aldactone will be life-saving.

When used alone, Aldactone will produce a satisfactory diuresis in about half of those patients whose edema is resistant to conventional diuretic agents.

When Aldactone is used in a comprehensive therapeutic regimen, which includes a mercurial or a thiazide diuretic, a satisfactory diuresis and relief of edema may be expected in approximately 85 per cent of edematous patients *who would not otherwise respond.*

DOSAGE: For most adult patients the optimal dosage of Aldactone, brand of spironolactone, is 100 mg. four times daily. Aldactone should be administered for at least four or five days before appraising the initial response, since the onset of therapeutic effect is gradual when it is used alone. Aldactone manifests accelerated activity with greater response as early as the first and second days when used in combination with a mercurial or thiazide diuretic.

SUPPLIED: Aldactone is supplied as compression-coated yellow tablets of 100 mg.

G. D. SEARLE & CO.
Chicago 80, Illinois
Research in the Service of Medicine

Editorial

REGRESSION IN THE TREATMENT OF MAMMARY CARCINOMA*

Progress in surgery does not always move steadily forward. There are times when it suffers regression. An instance of this occurred in the treatment of appendicitis in the years before the discovery of sulfanilamide, when the death rate rose steadily to 36 per 1000. During the past decade we have witnessed a similar deterioration in the treatment of mammary carcinoma. One cause for this is that the care of patients with this disease has been taken over by unskilled operators. The stimulus for this shift of patients came from McWhirter's teaching, that a simple mastectomy plus irradiation gives results which are as good as those following a radical mastectomy. With the prestige of the Edinburg Infirmary behind this doctrine, and the substitution of an easy operation for a difficult one, it is not surprising that hundreds of doctors began to operate on their own patients instead of referring them to competent surgeons. Following their poorly executed operations the patients were usually referred for radiation therapy to a person inadequately trained.

What is even more distressing is that many competent surgeons, either out of pessimism over the results of their radical mastectomies or from misinterpretation of McWhirter's results, changed over to doing simple mastectomies. It is to surgeons in this group that this editorial is

*Reprinted from THE AMERICAN SURGEON, Vol. 26, No. 1, Jan., 1960

ARIZONA MEDICINE

Journal of

The ARIZONA MEDICAL ASSOCIATION, Inc.
AND
MEDICAL SOCIETY OF THE
UNITED STATES AND MEXICO

VOL. 17 MAY, 1960 NO. 5

Darwin W. Neubauer, M.D. ..... Editor
Louis G. Jekel, M.D. ..... Assistant Editor

EDITORIAL BOARD

Andre J. Bruwer, M.D. — Juan E. Fonseca, M.D.
Richard L. Dexter, M.D. — Clarence L. Robbins, M.D.
Leslie B. Smith, M.D.

ASSOCIATE EDITORS

Charles W. Elkins, M.D. ..... Neurosurgery
Jesse D. Hamer, M.D. .... American Medical Ass'n. & Legislation
A. K. Hansen, M.D. ..... Ophthalmology
John Kennedy, M.D. ..... Historical Section
Robert Lacock, M.D. ..... Ob-Gyn.
William B. McGrath, M.D. ..... Neuro-psychiatry
Augusto Ortiz, M.D. ..... Medical Society of U. S. and Mexico
C. Thomas Read, M.D. ..... Chest Surgery
Gerd Schloss, M.D. ..... Pathology
Paul L. Singer, M.D. ..... Genito-Urinary
L. D. Sprague, M.D. ..... Medical Economics
Alvin L. Swenson, M. D. ..... Orthopedics
Roger F. White, M.D. ..... Pediatrics

FORMER EDITORS

Frank Milloy, M.D. ..... Jan. 1944-Oct. 1952
R. L. Foster, M.D. ..... Nov. 1952-April 1956

ADVERTISING AND SUBSCRIPTION OFFICES
Paul R. Boykin, Business Manager
1021 Central Towers, Phoenix, Arizona
Eastern Representative
A. J. Jackson, President
State Medical Journal Advertising Bureau
510 N. Dearborn St., Chicago 10, Illinois

CONTRIBUTIONS

The Editor sincerely solicits contributions of scientific articles for publication in ARIZONA MEDICINE. All such contributions are greatly appreciated. All will be given equal consideration.

Certain general rules should be followed, however, and the Editor therefore respectfully submits the following suggestions to authors and contributors:

1. Follow the general rules of good English or Spanish, especially with regard to construction, diction, spelling and punctuation.
2. Be guided by the general rules of medical writing as followed by the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.
3. Be brief, even while being thorough and complete. Avoid unnecessary words. Try to limit the article to 1300 words.
4. Read and re-read the manuscript several times to correct it, especially for spelling and punctuation.
5. Manuscripts should be typewritten, double spaced, and the original and a carbon copy submitted.
6. Exclusive Publication — Articles are accepted for publication on condition that they are contributed solely to this Journal. Ordinarily contributors will be notified within 60 days if a manuscript is accepted for publication. Every effort will be made to return unused manuscripts.
7. Reprints will be supplied to the author at printing cost.

(The opinions expressed in the original contributions do not necessarily express the opinion of the Editorial Board.)

primarily directed. Let us look into the basis for their pessimism, and then into some facts about McWhirter's publications. Poor results following radical mastectomies are due to two causes: (1) operating on patients in whom the tumor is incurable; (2) whittling down the real Halsted procedure, either from ignorance, hurry, or sheer laziness. Haagensen has statistics to show that when these obstacles are overcome one can secure a 75 per cent 5-year survival rate in patients with axillary metastases of limited extent. The late Dr. Barney Brooks went to Scotland to asecrtain the basis for the dissatisfaction with the surgical treatment of mammary carcinoma. He found that the operations which were labeled "radical mastectomies" disregarded most of Halsted's principles and were not truly radical.

There are many competent surgeons who have followed McWhirter's lead without examining his work critically. Ackerman visited the Edinburgh Clinic and pointed out the following: 13 of the 719 patients did not have carcinoma; 220 of the patients had a concomitant bilateral oophorectomy. All of the patients in whom the disease persisted after irradiation were treated by an axillary dissection or by hormones. McWhirter's claim that radiation therapy destroys the malignant cells in lymph nodes has not been demonstrated; in fact, examination of his own material disproved this claim. Ackerman concluded, "He has presented no objective evidence as to the necessity for simple mastectomy."

Even if McWhirter's thesis were correct, there are two practical problems which should deter most surgeons in the United States from following it: (1) there are insufficient well-trained radio-therapeutists; (2) there are many patients who cannot afford the time and the expense required for proper radiation therapy. It seems clear, then, that simple mastectomy plus irradiation should be reserved for the patients who are too feeble to undergo an extensive procedure and for those with incurable disease. The hard and deplorable fact is that many women with a mammary carcinoma which is curable by a Halsted mastectomy are denied their only chance of living by the substitution of a simple mastectomy and irradiation. This is indeed the reverse of progress.

WARFIELD M. FIROR, M.D.
1101 North Calvert St.
Baltimore 2, Maryland

THE ARIZONA VIEW

Standards for judging drinking by drivers vary widely throughout the United States. There is one which has been selected as a model by the A.M.A. and the National Safety Council. It is the definition of the Arizona Supreme Court:

"The expression 'under the influence of intoxicating liquor' covers not only all the well known and easily recognized conditions and degrees of intoxication but any abnormal mental and physical condition which is the result of indulging in any degree in intoxicating liquors, and which tends to deprive him of that clearness of intellect and control of himself which he would otherwise possess.

"If the ability of the driver of an automobile has been lessened in the slightest degree by the use of intoxicating liquors, then the driver is deemed to be under the influence of intoxicating liquor. The mere fact that the driver has taken a drink does not place him under the ban of the statute unless such drink has some influence upon him, lessening in some degree his ability to handle said automobile."

JAMA Feb. 27, 1960

LETTER TO THE EDITOR

"The Board of Directors of The Arizona Medical Association, Inc., has reviewed the article of Mr. J. N. McMeekin appearing in the December issue of Arizona Medicine Journal and investigated its charges. It was the unanimous opinion of this Board that these allegations are not substantiated by fact. The Board of Directors wishes to inform the readership of this Arizona Medicine Journal that it stands foursquare and unanimously behind all actions taken by the Editor-in-Chief and the Publishing Committee of this Association.

Lorel A. Stapley, M.D.
Secretary

LETTER TO THE EDITOR

United States Senate
Washington, D.C.

March 14, 1960
Dr. Leslie B. Smith
1130 East McDowell Road
Phoenix, Arizona
Dear Dr. Smith:

Thank you for your recent correspondence discussing with me the problems our country's

senior citizens face in the area of medical care and services.

Not ignoring the difficult situation which confronts many older citizens who seek adequate medical care, there is an alternative to a dependence upon socialized medicine as proposed by H.R. 4700, the Forand Bill. I refer to the fact that today 40% of the people over age 65 are covered by some type of voluntary health insurance. More than 124 million Americans have one type or another of voluntary health insurance, and if the rate of increase in coverage of Old Age and Survivors beneficiaries that was recorded between 1951 and 1957 continues, about 70% of the people in this group will have availed themselves of health insurance by 1965.

Those who would link medical welfare benefits with those of OASDI paint a pretty picture but an incomplete one. Who is to pay the cost of such benefits which are sure to total a billion plus dollars a year? The Social Security Trust Fund cannot, if it is to retain its integrity; the only alternative, of course, is the federal government. No where in the Constitution of the United States is there given to the federal government the power to undertake the making of welfare payments to its citizens. Let me remind you also that should the government undertake such a program, an inevitable result will be further inflation, the inflation which today undermines your savings, your retirement incomes and social security benefits.

It is my great hope that as more and more of our people take advantage of voluntary health plans, as the medical profession, business and unions continue to cooperate in making such plans available, that here will be a sound solution to this problem, a solution in keeping with the traditions of our country and one which will not rob any American of his right to economic independence.

Sincerely,

BARRY GOLDWATER

LETTER TO THE EDITOR

United States Civil Service Commission
Bureau of Retirement and Insurance
Washington 25, D.C.

Memo to Editors:

For Your Information

The Bureau of Retirement and Insurance is receiving numerous queries from various sources asking whether the Civil Service Commission intends to request from Congress authority to delay the effective date of the Federal Employees Health Benefits Act of 1959. The law states that the effective date of the Health Benefits program is the first day of the first pay period which starts in July 1960.

In response to one such query, the Chairman of the Commission has stated flatly that "there will be no request for the deferment of the effective date so far as the Civil Service Commission is concerned."

ANDREW E. RUDDOCK,
Director

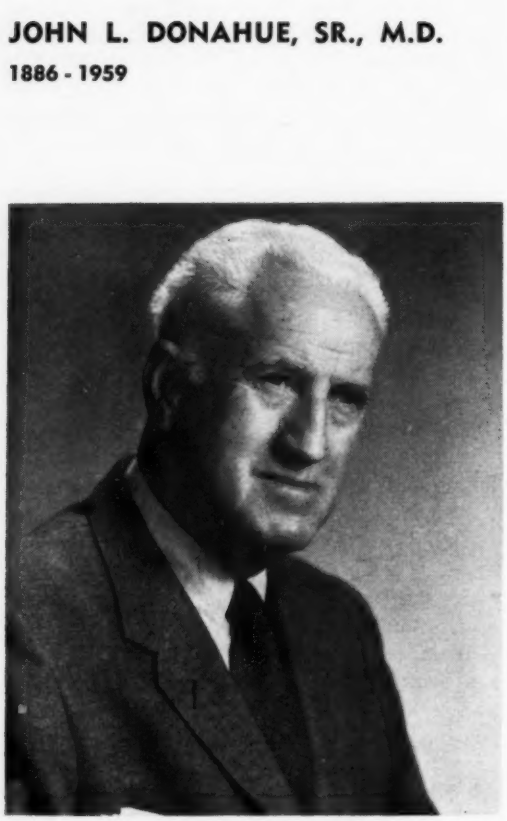
PAGET'S DISEASE

It has been estimated that roughly 3 to 4% of the population over the age of 40 years has Paget's disease. This makes Paget's disease among the most common of nonmetabolic bone diseases. From experience in 6 cases the anabolic steroid hormones, especially long-acting testosterone and estrogen preparations, are the treatment of choice in Paget's disease, as in postmenopausal osteoporosis. (Condensed from *California Medicine*, 91:245, 1959)

In Memoriam

JOHN L. DONAHUE, SR., M.D.

1886 - 1959



John L. Donahue, Sr., M.D.

Dr. John L. Donahue, Sr., who practiced medicine in Tucson for more than 20 years, died November 17, 1959. He was 73.

Born in Nesquehoning, Pa., he moved with his parents to Philadelphia, where he graduated from St. Joseph College, and from Jefferson Medical College in 1910.

Dr. Donahue, associated with St. Joseph's Hospital in Philadelphia, later specialized in mental diseases at State Hospital in Norristown, Pa. He served in World War I as a surgeon assigned from U. S. Army Medical Corps to the London General Hospital and Sixtieth Field Ambulance of the British Army, and was one of the first medical volunteers from this country.

After the war, Dr. Donahue did post-graduate work in eye, ear, nose and throat at the University of Pennsylvania, then continued in private practice in Philadelphia for several years.

Ill health caused him to go to New Mexico where he served with the U. S. Veterans Bureau Hospital at Fort Bayard, N. M. He was transferred to the Veterans Hospital in Tucson in 1929.

He went into private practice again in 1932, and in his later years specialized in psychiatry. He was a consultant to the Veterans Administration in psychiatry for many years and a member of the staffs of St. Mary's Hospital and Tucson Medical Center. He was a diplomate of the American Board of Psychiatry and Neurology and a member of several medical associations. He retired in 1953.

Surviving are his wife, Florence; two sons, Hugh L. of Los Angeles, and John L. Jr., of Tucson; a sister, Mary Donahue, of Philadelphia, and three grandchildren.

RESOLUTION
PIMA COUNTY MEDICAL SOCIETY

WHEREAS, the death of John L. Donahue, M.D., in his 74th year, brings to close recall his many years of devoted and valuable service as a physician in this community, and

WHEREAS, in particular the Pima County Medical Society recognizes the loss of a loyal senior member and an esteemed colleague, BE IT THEREFORE

RESOLVED: That the Pima County Medical Society inscribe in its permanent records its feelings of sorrow, and convey to Doctor Donahue's family an expression of deep sympathy in their bereavement.

JAMES HENRY ALLEN, M.D.

1887 - 1959

Dr. James H. Allen died in Phoenix, October 1, 1959, after a brief illness.

He was born at West Medway, Massachusetts, March 24, 1887. He graduated from Willaston Academy, Willaston, Massachusetts. In 1915 he graduated from the Georgetown University School of Medicine. After an interneship he was serving a residency at the Columbia Hospital in Washington when the United States entered World War I. He served duirng the war in the Army Medical Corps, and later was Chief Surgeon of the United States Public Health Service Hospital at Norfolk, Virginia.

James Henry Allen, M.D.

He came to Arizona in 1920, serving on the medical staff of the Veterans' Administration Hospital at Fort Whipple until 1926 when he opened his practice in Prescott. He soon developed an excellent practice and was highly regarded throughout Northern Arizona, and greatly beloved in Prescott.

For years he was actively interested in civic affairs. He served on the local school board from 1938 to 1947, and as physician to the Pioneers' Home from 1933 to 1947.

He was Assistant County Physician from 1942 to 1946 and County Physician from 1947 to 1956. During this period he devoted most of his time and energy toward improving the County Hospital. A new $300,000 building was completed, the staff and personnel were reorganized, and the Hospital, for the first time, met the requirements of the State Board of Health. Having studied the problems of hospital care in smaller communities, he recognized the importance of expanding the facilities at the Yavapai County Hospital and the fallacy of trying to provide duplicate facilities in a community such as Prescott. Because of his outspoken manner and his impatience at the slow rate of hospital improvement he not infrequently incurred the displeasure and criticism of his associates.

Dr. Allen was a member of the Yavapai County Medical Society, the Arizona Medical Association, the American Medical Association and the American College of Surgeons. In spite of his many outside interests, he was an extraordinarily keen practitioner. Each year, for many years, he made it a practice to spend at least two weeks in post-graduate studies.

Jim Allen will long be remembered for his modest, unassuming manner and for his kind and sympathetic treatment of his patients.

His widow, Mrs. Mary Allen, resides at 878 Evergreen Road, Prescott, Arizona.

GUY PETER SLAUGHTER, M.D.

1912 - 1959

Dr. Guy Peter Slaughter died July 13, 1959.

Dr. Slaughter was born in Burke, South Dakota, January 7, 1912. He received the degree of Doctor of Medicine from the University of Nebraska Medical College, June 7, 1937; was licensed to practice Medicine in Arkansas, Nebraska Medical College, June 7, 1937; was li- in the Medical Corps, Army of the United States, being honorably discharged July 20, 1945; practiced in Nebraska before coming to Arizona in 1958; practiced in Show Low, Springerville, and Winslow; and was a member of the Navajo County Medical Society, the Arizona Medical Association, and the American Medical Association.

An Ethical Professional Service for Your Patients Founded 1936

Get Patients In The "Paying" Habit . . .

In this day and age, monthly payments are the vogue. There is much good in them, too. They provide an easy method of payment, thus allowing more people to have more and better things; but most important of all, they develop the habit of paying bills promptly.

Many doctors have realized this is true and, therefore, have suggested to their patients the Budget Plan for Health which helps the patient meet his financial obligations to his doctor and yet have easy monthly payments at bank rate interest. The doctor gets his money right away . . . no longer is he the last in line to be paid and he builds goodwill for himself by being considerate of his patient's financial circumstances.

If you haven't suggested the Budget Plan for Health to your patients; start now. End shrinkage of your book accounts that comes so quickly . . . an account two months old is only worth 90c on the dollar and each additional month brings greater shrinkage.

Slow paying accounts cost you money in billing expenses and loss of interest. You've earned your money . . . you're entitled to it. Do as many Arizona doctors do: Suggest the Budget Plan for Health. It's ethical. Remember, Doctor, a paid-up patient is a satisfied patient . . . your best practice builder.

Medical & Dental Finance Bureau

First Street at Willetta • Phoenix • AL 8-7758
31 North Tucson Boulevard • Tucson • MA 3-9421
456 North Country Club Drive • Mesa • WO 4-5668

Arizona Medical Association Reports

LINDSAY E. BEATON, M.D.

President
The Arizona Medical Association, Inc.
1960 - 1961

Lindsay E. Beaton, M.D.

Dr. Lindsay E. Beaton of Tucson is a specialist in psychiatry and neurology. He was born in Chicago, Illinois on January 25, 1911. He moved to Tucson in 1946 and has been engaged in private practice since then.

Dr. Beaton attended the secondary schools of Evanston, Illinois and in 1928 entered Dartmouth College, receiving his A.B. degree in 1932. He graduated from Northwestern Medical School, receiving his M.D. degree in 1939. He also holds an M.S. degree from that university's Institute of Neurology. His interneship was served at Passavant Memorial Hospital in Chicago and his residency at Northwestern University Medical School, Institute of Neurology. He is certified in both specialties by the American Board of Neurology and Psychiatry.

The record of Dr. Beaton's professional career includes the facts that he was Medical Fellow, National Research Council, 1939-1941, and thereafter served in the U. S. Army Medical Corps (Captain to Lt. Colonel, 1941-1946) in the South and Central Pacific theatres. He holds three combat stars. Currently Dr. Beaton is consultant to the Veterans Administration Hospital in Tucson and to the U. S. Army Hospital, Fort Huachuca, Arizona. He was formerly an instructor in Anatomy and Neurology at Northwestern Medical School, and at present is a lecturer for the Department of Psychology, University of Arizona.

Dr. Beaton is a member of Phi Beta Kappa, Alpha Omega Alpha and Sigma Xi; the Academy of Neurology (Fellow), American Psychiatric Association (Fellow), American Medical Association, American Academy of Forensic Sciences (Fellow), Pima County Medical Society and The Arizona Medical Association, Inc.

Public offices held by Dr. Beaton and also civic committees on which he has served are: Member State Hospital Board, 1952; President, Tucson Child Guidance Clinic, 1958-1959; President, Family Service Agency, 1956-1957; and Chairman, Social Planning & Priorities Committee. He is at present an active member of the Tucson Community Council.

Dr. Beaton is the author of an imposing list of thirty-eight articles published in scientific journals. He was Associate Editor, *U. S. Army Medical History of World War II* for the volume on "Neuropsychiatry in the War Against Japan." The hobbies and special activities of Dr. Beaton are tennis, music and oriental art.

Dr. Lindsay E. Beaton is the son of David Beaton, Jr., insurance broker, of Chicago, and of Vera de Lipkau Beaton (deceased). He has one sister, Mrs. Lorna Beaton Williams (George O. Williams) also of Chicago.

Dr. Beaton is married to the former Mildred O. Chapman, their children being Kathleen Fraser Beaton, born February 24, 1947, and Jeremy de Lipkau Beaton, born June 30, 1948.

BOARD OF DIRECTORS

Meeting of the Board of Directors of The Arizona Medical Association, Inc., held February, 1960, Leslie B. Smith, M.D. (Vice-President), chairman, presiding.

MEMBERSHIP CLASSIFICATION CHANGES

Pima County Medical Society

It was moved by Doctor Hileman, seconded by Doctor Beaton and unanimously carried that the Board approve Associate membership, dues exempt, account retirement, for both John E. Mulsow, M.D., effective January 12, 1960, and Charles W. Rudolph, M.D., effective December 31, 1959.

It was reported that the Board of Directors of Pima County recommended and that the Society elected George O. Hartman, M.D. and Charles N. Sarlin, M.D. to Honorary membership. It is requested that the Association, through its House of Delegates, in annual meeting this year give similar favorable consideration thereto. Clarification of procedure was sought. Question was raised as to whether "Honorary" membership is appropriate for the purpose intended; i.e. to provide continuing membership for former active members of this Association who are now in practice in another State.

It was moved by Doctor Steen and seconded by Doctor Moody that this matter be referred to the Articles of Incorporation and By-Laws Committee to formulate a fourth category under (C) Associate Members (Chapter II Membership, Section 3, Classes of Membership) in order that there may be included licensed physicians outside the State of Arizona as Associate members.

It was moved by Doctor Beaton, seconded by Doctor Edel and unanimously carried that the aforementioned motion be amended to the effect that the question be referred to the Articles of Incorporation and By-Laws Committee for their consideration; and that this (suggestion) is one possibly but not binding their hands to this as the only thing that they can do.

Question was then called on the original motion, as amended, which was unanimously carried.

Further discussion ensued and from information presented it was believed that Doctor Hartman would be eligible for Associate membership as it is understood he is in "retirement" and not engaged in active practice.

It was moved by Doctor Beaton, seconded by Doctor Hileman and unanimously carried that the Board would approve Associate membership dues exempt, account retirement, for George O Hartman, M.D. if he is found to be eligible when his situation is checked and he is recommended therefor.

Yuma County Medical Society

It was moved by Doctor O'Neil, seconded by Doctor Hileman and unanimously carried that the Active membership in this Association of Jerome E. Andes, M.D. be restored, it having been determined to the satisfaction of this Board (and the Yuma County Medical Society) that at least half of his "active private practice" is in Arizona (the remainder in Needles, California).

Pima County Medical Society

MENTALLY AND MOTOR RETARDED CHILDREN

The Board of Directors of the Pima County Medical Society in meeting held January 7, 1960 received, reviewed and approved a report of its Advisory Committee for mentally and motor retarded children which recommended that additional facilities, from a State level, of a Children's Colony type be strongly urged, either as an expansion of the present facilities or the location of an additional and similar facility in the neighborhood of Tucson. While over a period of two years the clinic program of the Diagnostic and Planning Group, designated by the Society, has functioned well, insofar as services and facilities are available, in the handling of the mentally and motor retarded children, it is the feeling that there is a very definite lack of and need for institutional facilities such as are found in the Children's Colony.

Doctor Hamer stated that he felt quite certain the State Welfare Department would be most interested in this project and their support might be anticipated. He suggesting contact.

It was moved by Doctor Beaton, seconded by Doctor Edel and unanimously carried that this matter of expanding the Children's Colony or providing equal facilities be referred to the the Legislative Committee for study and report.

BENEVOLENT AND LOAN FUND COMMITTEE

Doctor Yount reported that there are five applications which have been proposed, developed to the point of getting insurance to secure the

money for the Association totalling $6,400.00. Question has been raised as to whether all the aplications should be submitted for legal review to make sure all the things are in there before the checks are written. None of the students have received payment as yet. We are now attempting to obtain life insurance.

Considerable discussion ensued referable to the propriety and legality of requiring a life insurance policy in a sum in excess of the actual amount of the loan; whether the Association or the borrower should acquire it; whether some type of policy could be obtained similar to that used by small loan companies wherein the coverage is for the exact amount of the loan; whether such insurance requirement should be abolished; the mechanics of follow-up should the borrower be required to obtain the insurance as regards premium payments, stipulation of beneficiary and any subsequent change, all of which would require the full cooperation of the insurance carrier; and in the event the Association acquires the insurance and pays the premium, which is proposed, is such premium cost to be added and made a part of the total loan, and is it a proper debt chargeable and collectible from the borrower? Counsel spoke to the question and again expressed concern in the matter of insurance, especially as regards the requirement of procurement of a policy in excess of the actual amount of the loan.

It was directed that the matter of insurance be referred back to the (Benevolent and Loan Fund) committee with Mr. Jacobson's comments and with the request that the chairman report thereon to this Board at its next meeting.

GRIEVANCE COMMITTEE

Case No. 82

The Grievance Committee reported upon the results of its deliberation and recommendation of reprimand in the matter of case No. 82.

It was moved by Doctor Young, seconded by Doctor Beaton and unanimously carried that this Board very definitely accepts the recommendation of its Grievance Committee and does reprimand the defendant in this case with the very sincere admonition by this Board to the defendant to be certain to guard against any recurrence of a problem of such serious nature as is here concerned.

Case No. 85

The Grievance Committee reported upon the results of its deliberation and recommendations in the matter of case No. 85.

It was moved by Doctor Neubauer, seconded by Doctor O'Neil and unanimously carried that the Board adopts each and all of the recommendations of the Grievance Committee as its own; that it direct the defendant to immediately comply in every detail; and that the defendant accept this action of the Board of Directors as a reprimand by it for the reasons outlined.

Case No. 87

Doctor Manning, chairman of the Grievance Committee, reviewed in detail this case. It was scheduled for hearing and the defendant's attorney requested postponement.

It was moved by Doctor Edel, seconded by Doctor Polson and unanimously carried that this matter be referred to the Grievance Committee for investigation in all facets.

Investigations

Doctor Manning reviewed in detail the problems confronting the Grievance Committee in lack of authority to carry out investigations concerning matters dealing with members of the Association without specific written complaint before it. Case No. 87 is one in point and was discussed at length; another involving the practice of a member which has been the concern of many over a period of several years. The desirability of a possible amendment to the By-Laws to authorize this Committee to undertake investigations of members whenever indicated was evaluated. Division of authority and levels of jurisdiction weighed heavily in the discussion. Reference was made to the disciplinary statute in effect in the State of Washington and current survey being made by AMA in an attempt to analyze the effectiveness of such laws presently in operation.

It was moved by Doctor Jarrett, seconded by Doctor Melick and unanimously carried that the Board of Medical Examiners of the State of Arizona be requested to carry out what investigations they feel indicated in the instance of the specific individual in question.

It was moved by Doctor Melick, seconded by Doctor Beaton and unanimously carried that the Board of Directors request of Mr. Jacobson an investigation of the State of Washington Disciplinary Committee and report back to the Board of Directors as to whether or not this might be something we could permit (adopt).

LEGISLATIVE COMMITTEE

Fluoroscopic Shoe Fitting

The Arizona Chiropody Association advised it had reaffirmed its stand opposing fluoroscopic shoe fitting and sought the cooperation of this Association in securing necessary legislation prohibiting it. The Legislative Committee in meeting held January 10, 1960 recommended to this Board that the Association also approve the elemination of the use of fluoroscopic shoe fitting equipment in stores, suggesting that the Arizona Chiropody Association take the initiative.

It was moved by Doctor Hileman, seconded by Doctor Edel and unanmiously carried that we reiterate our previous stand.

Ambulances — Emergency Medical Care

In the matter of "transportation of the injured" and in line with California statutes requiring either the operator of an ambulance in emergency service or an attendant on duty therein to possess a "first aid certificate" issued by the United States Bureau of Mines, the Legislative Committee recommends to this Board that a memorial be given to Doctor MacDonald Wood for presentation to the Arizona Corporation Cmmission to the effect that an increase in ambulance service fees on a competitive basis with other States be considered; and that Doctor Wood take this problem to the Maricopa County Medical Society's Legislative Committee for further action. It further recommends to this Board acceptance of the California Act (Section 21714 of the Vehicle Code) referable to operation of ambulances in emergency service, requiring first aid certification of operator or attendant on duty therein; and that following any necessary modification thereof to coordinate it with any existing Arizona statutes, that steps be taken to introduce the measure.

Doctor Jarrett reviewed his understanding of the intent of this action, including the matter restraining speed and use of sirens and observation of the usual speed regulations in whatever zone they are driving in.

It was moved by Doctor Jarrett, seconded by Doctor Edel and unanimously carried that we accept the recommendation of the Legislative Committee (in the matter of the first aid training requirement) including adherence to legal speed and driving regulations, with the exception of the portion that has to do with petitioning the Corporation Commission for a fee increase.

Commissioner of Public Health — Salary and Qualifications

A detailed report was submitted setting forth activities dealing with the Arizona State Department of Health and its Board and recommending to the Board of Directors approval of the proposed amendment to Section 36-135 A.R.S., providing for the establishment of a more realistic salary ($12,500.00 to $17,500.00) for the position of Commissioner of Public Health (a doctor of medicine) and prescribing adequate qualifications for the position.

The Legislative Committee further recommended approval of three additional measures to be introduced by the State Board of Health including (1) an appropriation of $25,958.00 to complete the purchase and installation of necessary equipment, etc. to refurbish quarters of the State laboratory in the Tucson State office building; (2) amending Section 36-132 B. (A.R.S.), introduced as H.B. 100 in 1959, providing authority to enter into contracts with the United States or any department or agency thereof, or with the State or any political subdivision or agency thereof, or with any private organization or agency thereof, for the purpose of providing additional professional or public health services to the State, to accept and expend funds for satisfactory services in accordance with terms of contract, said funds to be maintained separately and shall not become part of the State general fund; and (3) amend Section 36-105 (A.R.S.) intended to provide for the more expeditious handling of procedures dealing with abatement of public nuisances and submit such recommendations to the Board of Directors for its further consideration.

It was moved by Doctor Jarrett, seconded by Doctor Edel and unanimously carried that we accept the Legislative and Public Health Committees' report.

Received and noted was a resolution passed February 1, 1960 by the Maricopa County Medical Society urging members of the Arizona State Legislature to adopt legislation to increase the salary of the State Commissioner of Health and further provide for the establishment of proper qualifications for this position. Acknowledgement of receipt of this communication and advising action taken by this Board was directed.

AMA "Uniform Hazardous Substances Act"

The AMA again submitted a model bill approved by its Board of Trustees in October of 1956, known as the "Uniform Hazardous Substances Act," drafted by that Association's Committee on Toxicology after eighteen months of study, designed to require warning labels and the identification of hazardous ingredients in household, commercial and industrial chemical products. A federal version thereof (H.R. 7352 – 86th Congress) was introduced in the United States House of Representatives in May of 1959. It urged stimulation of activity and interest in this State's Legislature.

It was moved by Doctor Edel, seconded by Doctor Moody and unanimously carried that we take no further action on this until precedence has been established by other States in the Union.

Chiropody – Disability Insurance – Legislation

A Legislative bill proposed for introduction into the 24th State Legislature by the Arizona Chiropody Association relating to disability insurance: "Providing that the policy may permit insured to select the services of any licensee under Title 32, Chapter 7, to perform the services and provide for payment of the charge for services without requiring that insured first pay such expenses," was forwarded by that organization for review by this Association and hoped for support. It was referred to counsel and his opinion was presented and read.

It was moved by Doctor Edel, seconded by Doctor Young and unanimously carried that we not favor the proposed bill.

Arizona State Hospital – Land Sale

It was reported that Representative Nelson D. Brayton, M.D. (Gila) expressed concern over the proposed sale of a portion of land at the Arizona State Hospital to accommodate the proposed future site of a unit of the Brigham Young University, primarily because he feels this might be a potential site if, as and when consideration is given to the establishment of a medical school in Arizona. He seeks interest and support of The Arizona Medical Association in his position.

Further, Doctor Brayton seeks the support of this Association in H.B. 62, introduced by him January 18, 1960, an Act relating to public health and safety; providing for the establishment of a Cancer Advisory Committee.

It was moved by Doctor Edel, seconded by Doctor Steen and unanimously carried that until action has been taken upon it (subject to further study by our legal counsel and action of our Legislative Committee) we table it until the next meeting.

It was moved by Doctor Edel, seconded by Doctor Beaton and unanimously carried that we table it (matter dealing with sale of Arizona State Hospital land).

State Legislative Memorial – Social Security

The Chairman presented for information and discussion H.M. 6, introduced February 1, 1960 into the 24th State Legislature by members Kartus, Austin and Grimes of Maricopa, the memorial requesting the Congress of the United States to extend the application of benefits of Old Age and Survivors Insurance and Unemployment Compensation to all citizens of the nation.

It was moved by Doctor Edel, seconded by Doctor Polson and unanimously carried that a resolution be adopted relative to this, to be brought before the House of Delegates of our Association for discussion by the House of Delegates.

It was moved by Doctor Stapley, seconded by Doctor Edel and unanimously carried that if they are requested to give an opinion on this particular matter, that we state we have referred this to our House of Delegates and that we have not gone on record as favoring it or opposing it at the present time.

MEDICAL ECONOMICS COMMITTEE

Fee and Contractual Medicine Subcommittee

The Arizona Chapter of the American College of Surgeons reported that in annual meeting November 20, 1959, that body adopted a motion:

That it is medically ethical that the county societies may accept the principle of the relative value fee schedule for industrial and commercial groups, the unit value to be separately negotiated for each group.

Further, because of extending discussion about the principle of the relative value fee schedule it was felt that more consideration should be given to it prior to a State Association decision; therefore, it adopted the following motion:

The Arizona Medical Association, Inc. be requested to investigate the relative value fee

schedule and present it to the House of Delegates.

It was pointed out that at the request of the Professional Committee the matter of fee schedule was referred to the subcommittee on Fee and Contractual Medicine for investigation and report.

It was moved by Doctor Yount, seconded by Doctor Edel and unanimously carried that we take no further action at this time, awaiting the report of the Fee and Contractual Medicine subcommittee.

Medicare Subcommittee

Following review by counsel as to extension of the Medicare contract for one year, resulting in his recommendation that certain clarifications previously made by letter by the Contracting Officer be again similarly stipulated in the instance of this renewal contract; review by the staff and Fiscal Administrator as to operational procedures, the latter recommending approval, the following supplemental agreements were presented for execution authorization:

1. Contract Extension (Renewal) Modification No. 47 3-1-60 – 2-8-61 Supplemental Agreement

II. Supplemental Agreement – Annex I – Appendix A Deletion and Substitution of Pages 22-22a-22b Regulations – above Contract Extension

III. Supplemental Agreement – Annex I Deletion Paragraph 5, Page 38, Medicare Manual and Schedule of Allowances and Substitution of New Paragraph and Paragraph 5a – Multiple Surgical Procedures.

IV. Supplemental Agreement – Annex I – Appendix IX A, Articles 1 and 3.

It was moved by Doctor Jarrett, seconded by Doctor Edel and unanimously carried that the (stipulated) officers of the Association be authorized to sign the supplemental agreements (presented) including the extension of the Medicare Program, for one year.

PROFESSIONAL COMMITTEE

Serological Tests – Marital Statutory Repeal

The Professional Committee, in meeting held January 10, 1960, received a report from its subcommittee on Venereal Diseases on the subject of pre-marital examinations and value of the blood specimen serological test provided by statute enacted in 1957 (Title 25, Marital and Domestic Relations, Chapter 1 Section 25-103-01 through 103-10 A.R.S.).

The purpose of this statutory regulation is considered twofold: (1) one of "delay" (waiting period) in the issuance of a marriage license; and (2) examination, including a standard serological test as may be necessary for the discovery of syphilis. To dispose of (1) above, no one is in disagreement with "delay." Possibly the waiting period should be extended; however, if this be the major intent of the legislature there is unanimous agreement that it should not be coupled with a medical problem or examination of questionable value, as prescribed.

Progress over the years in the treatment of syphilis (relatively simple today) was reviewed, as were State-wide experiences available; concluding that as best as can be determined from all available statistics, the Marital Law, since its enactment, has had no noticeable effect upon any decline of syphilis in Arizona. If the State wants "delay" in marriage licensing, have it, but let's not use this test as the basis. The emotional and moral factor should not be confused from the medical standpoint. The economical load does not justify the test. It is not an aid or alternative, in instances of lues, for having it done. Steps should be taken to repeal that portion of the existing law requiring the serological test. It is not of significant value in control of infectious cases of syphilis. It can and does add moral and emotional upsets in the instance of a false positive reaction.

The following resolution was unanimously adopted by the Professional Committee:

"WHEREAS, experience has shown the serological test to be of little value in case-finding of syphilis; and

"WHEREAS, morally we are in favor of a law requiring a 'waiting period' before the issuance of a marriage license in this State, but not on the basis of a pre-marital blood test, now, therefore, be it

"RESOLVED, that steps be taken to repeal that portion of the statute now in effect requiring 'examination, including a standard serological test, as may be necessary for the discovery of syphilis,' for the reasons: (1) it is a significant added expense; (2) it does rarely reveal infectious syphilis; and (3) it may and does cause serious emotional problems in the instance of a false positive reaction."

It was moved by Doctor Jarrett, seconded by

Doctor Young and unanimously carried that:

WHEREAS, it is now medically accepted that the serologic test for syphilis is of little use in case-finding of the disease and rarely reveals an infectious stage of the disease; and

WHEREAS, the mandatory performance of the test prior to marriage is therefore an unwarranted expense for couples about to be married; and

WHEREAS, serious emotional problems are caused by false positive reactions which occur in approximately fifty per cent of positive reactions; now, therefore, be it

RESOLVED, that The Arizona Medical Association, Inc., acting to spare the citizens of Arizona from a requirement that, in the light of recent experience, does not protect individual or public health, recommends repeal of that portion of the statute requiring a standard serological test.

PROFESSIONAL LIAISON COMMITTEE

Arizona AMEF Subcommittee – Report

Harold W. Kohl, M.D., Chairman of the subcommittee on Arizona AMEF of the Professional Liaison Committee recommends a suitable citation for presentation to the Arizona Pharmaceutical Association for their adoption and support of the "Arizona Plan," possibly a framed parchment reading: "In recognition of its outstanding contribution of the free system of medical education in these United States by its generous support of the Arizona Plan, presented in deep appreciation by The Arizona Medical Association, Inc."

It was moved by Doctor Neubauer, seconded by Doctor Beaton and unanimously carried that Doctor Kohl prepare such a citation for presentation at some time during their next annual meeting, suggesting the use of the plaque we have had under discussion, which will serve for this purpose also.

Doctor Kohl by letter expressed his views, opposing any thought of transferring AMEF contributions to the Benevolent and Loan Fund of this Association, feeling that each has its specific purpose.

Public Health Subcommittee

Donald E. Nelson, M.D., Safford, by letter dated January 8, 1960, expressed his views as to what should be the aims and proposed future programs of the State Health Department, supporting the basic six adopted by the AMA House of Delegates in 1950; i.e. (1) vital statistics; (2) Public Health education; (3) environmental sanitation; (4) Public Health laboratories; (5) communicable disease control; and (6) maternal and infant hygiene in cases in which private facilities are unavailable, those excluding the socialistic motivated diabetic, blood pressure, etc. testing programs. This matter has been referred to the subcommittee on Public Health.

Allied Professions Subcommittee

The Arizona Chiropodist Association seeks approval of this Association of a movie film developed by that group through Wyeth emphasizing with picture and discussion the role of the chiropodist in the clinic and hospital, for display before county societies, which suggestion is recommended by this committee.

It was moved by Doctor Steen, seconded by Doctor Manning and unanimously carried that the report of the Professional Liaison Committee (in this regard) be not accepted.

Arizona AMEF Subcommittee

The following recommendations were presented:

1. The Woman's Auxiliary of The Arizona Medical Association, Inc. be informed by a letter, to be read at its annual business meeting in 1960, of the gratitude we express and of the support we pledge to them in their continued efforts.

2. That the dues increase of $10.00 per active member per annum earmarked for aid to medical education through AMEF be held inviolable until such time as it may seem practicable to increase that amount.

3. That all doctors in our State contemplate well the financial needs of our medical schools as well as the constant attempts at each Session of Congress to introduce bills to subsidize educational institutions, including medical schools; and that each individual one of us ask ourselves, "Have I done my part in helping to preserve medical education in the United States free of government control and dictation?"

It was moved by Doctor Steen, seconded by Doctor Edel and unanimously carried that we accept the first two recommendations of this committee.

Governmental Medical Staffs Subcommittee

Associate with the current activities of the N.O.D. in the vicinity of Flagstaff, specifically at Bellemont, in hospitalization and medical treatment of civilian civil service employees and their dependents by military personnel and

facilities, it is recommended to the Board that a memorial be prepared and forwarded to the appropriate designated authorities, protesting the current practice of using military personnel and facilities to hospitalize and medically treat civilian civil service employees of the Navajo Ordnance Depot.

It was moved by Doctor Hileman, seconded by Doctor Young and unanimously carried that we accept (this portion of) the report.

Nurses Subcommittee

It is recommended that the Board of Directors correspond officially with the Arizona State Nurses Association, the Arizona Federation of Licensed Practical Nurses, and the Arizona League for Nursing, informing them to meet with the subcommittee on Nursing for the purpose of discussing problems of mutual interest.

It was moved by Doctor Steen, seconded by Doctor Young and unanimously carried that this (portion of) report be accepted.

Woman's Auxiliary Subcommittee

In the matter of extending the Student Nurses Loan Fund program of the Woman's Auxiliary to include students in paramedical facilities, and suggestion following survey undertaken and completed by a special committee of the Auxiliary, which concluded "that at this time we might also consider the fitness of including the collegiate nursing course definitely, and possibly the medical technology course if finances permit," it was the considered opinion of the members of the subcommittee on Woman's Auxiliary that they ought not to, which has been accepted by the Professional Liaison Committee and constitutes its recommendation to the Board of Directors. Inclusion of students undertaking a two-year nursing school course at the Arizona State University affiliated with the Maricopa County General Hospital, Phoenix, with the support of the Maricopa County Medical Society, it was determined that they should not at this time, which is also the recommendation of the Professional Liaison Committee to the Board of Directors.

It was moved by Doctor Young, seconded by Doctor Steen and unanimously carried that (this portion of) the report be accepted.

Schools Subcommittee

It was recommended that this Association be officially actively represented in the State Advisory Committee on School Health and that Noel G. Smith, M.D., Chairman of the subcommittee on Schools of the Professional Liaison Committee be designated such representative.

It was moved by Doctor Young, seconded by Doctor Steen and unanimously carried that this recommendation be accepted.

In the matter of "School Health Services," it was recommended that such services in all cases should be designed to protect pupil health, to promote the maximum emotional, mental and physical health of the child, in order that he may most effectively function during the school day, and based on accepted standard, adaptability of plan to community operation, and influenced by local custom, professional personnel and other services available, said services being outlined in detail.

It was moved by Doctor Young, seconded by Doctor Steen and unanimously carried that we adopt this report and that a letter be forwarded to this subcommittee expressing our appreciation and thanks for the amount of work entailed in this very thorough documentation.

This report was considered newsworthy; accordingly, it was further directed that it be turned over to the Chairman of the Public Relations Committee for such attention.

PUBLISHING COMMITTEE

Arizona Medicine

DOCTOR NEUBAUER: "I do not know if you want to go into this. You saw our very good publicity in the December issue (of Arizona Medicine) which appeared the third week of January. I wrote up a report in answer to that. I think it is lengthly. I have already submitted it to Dermont (Doctor Melick) and Lindsay (Doctor Beaton). It is late in the day. I will be very happy to read it to you; I have spent some time on it but the point is: they know the content; Paul (Mr. Boykin) and Bob (Mr. Carpenter) have heard it; I have answered all the charges; I feel they are unfounded; they do not deserve an answer from me and he has had as much answer as he is going to receive as far as I am concerned. There is no question in my mind we made the right move in disassociating ourselves from Mr. McMeekin. Whether we can prove to you that this is the right move to publish it ourselves, only time can tell. My suggestion to you would be that if all these libelous, unfounded statements were made, possibly the simplest thing to do would be to take this report of mine and have a sub-

committee review it and pass judgment on his statements and my statements and issue a statement in accordance therewith."

It was moved by Doctor Beaton, seconded by Doctor Young (and several others) and unanimously carried that the Board of Directors has investigated this and found no substantiation to any of Mr. McMeekin's allegations, and wishes to inform the readership of this Journal that it stands foursquare and unanimously behind all actions taken by the Editor-in-Chief and the Publishing Committee.

AMA Clinical Session — Dallas

It was reported that this Association's participation in the "Southwestern Hospitality Room" during the AMA Clinical Session in Dallas amounted to $511.57, an appropriation of $600.00 having been previously authorized.

COMMUNICATIONS

National Foundation — Health Scholarship Program

It was moved by Doctor Edel, seconded by Doctor Running and unanimously carried that C. Selby Mills, M.D. (Phoenix), Laddie L. Stolfa, M.D. (Phoenix) and Richard O. Flynn, M.D. (Tempe), who were proposed by the President, be endorsed as this Association's nominees from which one will be selected to serve on this State's Selection Committee associate with The National Foundation's Health Scholarship Program, who will participate in the selection of recipients of the scholarships.

OTHER BUSINESS

Public Relations Committee

Donald A. Polson, M.D., Chairman of the Public Relations Committee, reported in the matter of the Arizona Press Club (annual) Awards for outstanding journalistic endeavor. This Association has participated in the past when it was possible to designate categories dealing with (a) "Best Story of Medical Interest," and (b) "Best Allied Story in Medicine." Last year it was $300.00. This year such opportunity was not afforded and the categories listed appear to have no specific relationship to medicine or science; accordingly, the Committee membership was polled and its was voted not to contribute this year. The Press Club was informed of this Association's continued interest in promoting good medical reporting and advised it stands ready to offer cash for such awards if they are in such category.

Action approved.

MEETING ADJOURNED AT 5:15 P.M.

LOREL A. STAPLEY, M.D.
Secretary

HOW WIDESPREAD IS MENTAL ILLNESS?

1. About 1 in every 10 persons (17 million) has some form of mental or emotional disorder requiring treatment.

1. Each year about 1,220,000 persons are given psychiatric care in mental hospitals or in psychiatric wards of general hospitals.

3. About 750,000 patients are under mental hospital care on any one day of the year.

4. On any day of the year there are as many patients under treatment in mental hospitals as in *all* other hospitals combined.

5. About 500,000 persons will be admitted during the year for psychiatric treatment to a mental hospital or to a psychiatric service of a general hospital. Of these, at least 100,000 will be re-admissions.

6. An additional 380,000 adults and children are seen each year in psychiatric clinics.

7. Psychiatric complications are important factors in 50% to 70% of the medical cases treated by physicians. At least 50% of the physical ailments treated in general hospitals have psychiatric complications.

A GUIDE TO

THE REALMS OF THERAPY BEST ATTAINED WITH

ATARAX®

(brand of hydroxyzine)

World-wide record of effectiveness—over 200 laboratory and clinical papers from 14 countries.
Widest latitude of safety and flexibility—no serious adverse clinical reaction ever documented.
Chemically distinct among tranquilizers—not a phenothiazine or a meprobamate.
Added frontiers of usefulness—antihistaminic; mildly antiarrhythmic; does not stimulate gastric secretion.

Special Advantages	Supportive Clinical Observation	...and for additional evidence
IN CHILDREN unusually safe; tasty syrup, 10 mg. tablet	"... Atarax appeared to reduce anxiety and restlessness, improve sleep patterns and make the child more amenable to the development of new patterns of behavior...." Freedman, A. M.: Pediat. Clin. North America 5:573 (Aug.) 1958.	Bayart, J.: Acta paediat. belg. 10:164, 1956. Ayd, F. J., Jr.: California Med. 87:75 (Aug.) 1957. Nathan, L. A., and Andelman, M. B.: Illinois M. J. 112:171 (Oct.) 1957.
IN ELDERLY PATIENTS well tolerated by debilitated patients	"... seems to be the agent of choice in patients suffering from removal disorientation, confusion, conversion hysteria and other psychoneurotic conditions occurring in old age." Smigel, J. O., et al.: J. Am. Geriatrics Soc. 7:61 (Jan.) 1959.	Settel, E.: Am. Pract. & Digest Treat. 8:1584 (Oct.) 1957. Negri, F.: Minerva med. 48:607 (Feb. 21) 1957. Shalowitz, M.: Geriatrics 11:312 (July) 1956.
IN ALLERGIC PATIENTS useful adjunctive therapy for asthma and dermatosis; particularly effective in urticaria	"All [asthmatic] patients reported greater calmness and were able to rest and sleep better... and led a more normal life.... In chronic and acute urticaria, however, hydroxyzine was effective as the sole medicament." Santos, I. M., and Unger, L.: Presented at 14th Annual Congress, American College of Allergists, Atlantic City, New Jersey, April 23-25, 1958.	Eisenberg, B. C.: J.A.M.A. 169:14 (Jan. 3) 1959. Coirault, R., et al.: Presse méd. 64:2239 (Dec. 26) 1956. Robinson, H. M., Jr., et al.: South. M. J. 50:1282 (Oct.) 1957.
IN HYPEREMOTIVE ADULTS does not impair mental acuity	"... especially well-suited for ambulatory neurotics who must work, drive a car, or operate machinery." Ayd, F. J., Jr.: New York J. Med. 57:1742 (May 15) 1957.	Garber, R. C., Jr.: J. Florida M. A. 45:549 (Nov.) 1958. Menger, H. C.: New York J. Med. 58:1684 (May 15) 1958. Farah, L.: Internat. Rec. Med. 169:379 (June) 1956.

Rx

New York 17, N. Y.
Division, Chas. Pfizer & Co., Inc.
Science for the World's Well-Being

SUPPLIED: Tablets, 10 mg., 25 mg., 100 mg.; bottles of 100. Syrup (10 mg. per tsp.), pint bottles. Parenteral Solution: 25 mg./cc. in 10 cc. multiple-dose vials; 50 mg./cc. in 2 cc. ampules.

BIOGRAPHICAL RECORDS

ARIZONA MEDICINE desires the following biographical material on all of the members of The Arizona Medical Association.

Many of you have filled out these questionnaires in the past. However, with the change of publication of the Journal, many of the biographies were lost, and obviously many pictures are outdated.

We would request that you please fill out the following form, tear out on the perforation and return it to the editor's office, along with a picture if possible.

Thank you for your cooperation.

ARIZONA MEDICINE
720 North Country Club Road
Tucson, Arizona

"ARIZONA MEDICINE" BIOGRAPHICAL FILE

Date.....

Name in full .....M.D.
(first) (middle) (last)

Professional mailing address .....
(street) (city) (state)

Residence .....
(street) (city) (state)

Place of birth .....Date of birth .....Sex.....

When did you move to Arizona?.....

In general practice ☐ Chosen Specialty.....
(name)

In private practice ☐ Retired ☐ Not in private practice ☐
(seeing patients)

If not in private practice, indicate major activity:.....
.....

Schools attended. Mention places, years and degrees, if any: .....
.....
.....
.....

Medical School and date of M.D. degree: .....

Internship: .....
.....

Residence: .....
.....
.....

Specialty Board certification: .....

Teaching Appointments: .....
.....

Your professional career. Please include dates and places. .....
.....
.....
.....

Medical, church, club or fraternal affiliations. Include dates of offices held. .....
.....
.....
.....

Public offices held and important civic, political, charitable or other committees on which you have served. Please include dates. .....
.....
.....

Please list any scientific or artistic accomplishments such as inventions, discoveries, writings, musical compositions, paintings, research, etc. .....
.....
.....

If ever in military service, give dates, branch of service, unit, decorations, etc. .....
.....

Interest hobbies or special activities: .....
.....

Names of parents and their address: (Please give names even if deceased)

Father .....
Mother .....
Father's vocation .....

Brothers and sisters and their addresses: (Please furnish sisters' given names and their husbands' names) .....
.....
.....
.....

Your marriage, to whom, when and where: .....
.....

Your children, their birth dates and addresses: .....
.....
.....

Signature .....M.D.
.....

ATTACH

PHOTO

HERE

Medical Society of the United States and Mexico

CUARTA REUNION ANUAL

RESUME

La Sociedad Médica de los EE.UU y México celebró su última reunión en Scottsdale, Arizona del 2 al 4 de diciembre próximo-pasado, y en Las Vegas, Nevada durante los días subsiguientes.

Resultó la convención extremadamente interesante, y asistieron socios representando sinco estados mexicanos, y quince estados norteamericanos.

Las sesiones científicas y las actividades sociales fueron admirablemente organizadas por las comisiones dirigidas por los doctores A. H. Tallakson y Carlos V. Greth, de Phoenix. Participaron como miembros activos de estas comisiones los doctores Clifford Ernst, Juan Fonseca, Wesley Forster, V. E. Frazier, Charles Kalil, Walter Lee, Joseph Lentz, Augusto Ortiz, Philip Rice y Lucy Vernetti.

Los aspectos científicos de la reunión quedaron cubiertos en forma brillante; en particular sobresaltaron las ponencias del Dr. Ignacio Chávez, de Guadalajara, y la del Dr. Maxwell Lockie, de Buffalo, N. Y.

La manera en que se presentaron los trabajos demostró que no es en realidad necesario que se hagan traducciones bilingües, ya que los socios presentes, de ambos países, estaban lo suficientemente familiarizados con el otro idioma para comprender el contenido esencial de los artículos leídos, sin mayor dificultad.

En la sesión de Las Vegas la Presidencia cambió de manos: del Presidente saliente Dr. Héctor Gonzalez Guevara, de Mazatlán, Sinaloa, al Presidente entrante, Dr. W. R. Manning, de Tucson, Arizona.

Como nueva Juanta Directiva fueron elegidos: Dr. Ignacio Chávez, Presidente Electo, México; Dr. Juan Fonseca, Vice-President, EE.UU.; Dr. Eduardo González Murguía, Tesorero para México; Dr. R. E. Hastings, Tesorero para los EE.UU.; Dr. Miguel Carreras, Secretario para los EE.UU. y el Dr. E. Contreras Reyna, Secretario para México.

La próxima reunión tendrá efecto en Guadalajara del 8 al 10 de noviembre de 1960, continuándose el 11 y 12 en Mazatlán. Aquellos de Uds. que tuvieron la opportunidad de asistir a la reunión que se llevó a cabo en Guadalajara hace dos años, o a la de Mazatlán hace cuatro años, recordarán que fueron éstas, las reuniones más interesantes y estusiantas que haya tenido esta Sociedad. Esperamos y anticipamos que la asistencia a esta próxima convención bata el record de asistencia en ambos Guadalajara y Mazatlan. Aquellos que se interesen en presentar alguna contribución científica, deben comunicárselo al Secretario.

FOURTH ANNUAL MEETING RESUME

The Medical Society of the United States and Mexico met from December 2nd to 4th in

Scottsdale, Arizona, and the following two days in Las Vegas, Nevada.

It was a most interesting meeting and was represented by members from five states of the United States of Mexico and fifteen states of the United States of America.

The scientific meeting and the social activities were admirably planned by the committee headed by Dr. A. H. Tallakson and Dr. Carlos V. Greth of Phoenix. Their committee members were, Drs. Clifford Ernst, Juan Fonseca, Wesley Forster, V. E. Frazier, Charles Kalil, Walter Lee, Joseph Lentz, Augusto Ortiz, Philip Rice, and Lucy Vernetti.

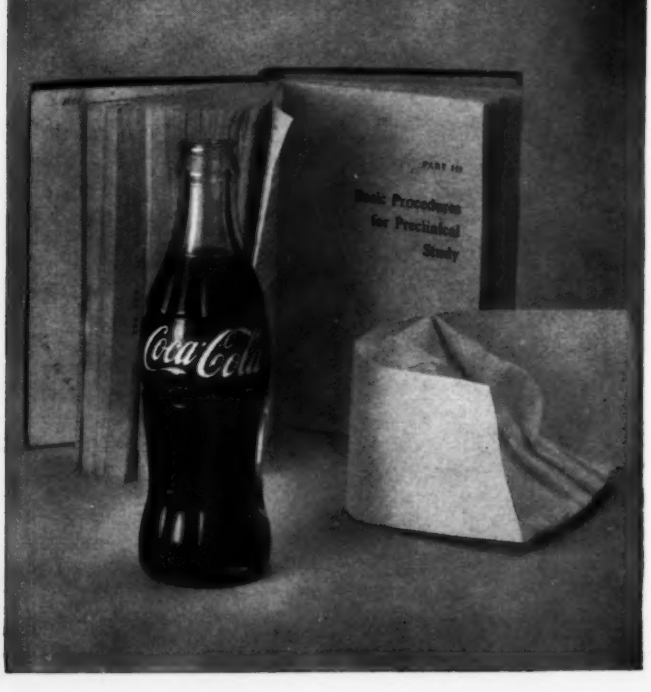
The scientific aspects of the meeting were extremely good, and highlighted were the papers by Dr. Ignacio Chavez of Guadalajara and Dr. L. Maxwell Lockie of Buffalo, New York, plus other excellent presentations.

These papers demonstrated the fact that bilingual translation is not a necessity since both the Mexican and United States members were sufficiently biligual to follow these scientific papers without difficulty.

At the meeting in Las Vegas the gavel changed hands from the retiring President, Dr. Hector Gonzalez Guevara of Mazatlan, Sinaloa, Mexico, into the hands of Dr. W. R. Manning, Tucson, Arizona, U.S.A.

Eelected as new officers were, Dr. Ignacio Chavez, President-Elect, Mexico; Dr. Juan Fonseca Vice-President, U.S.A.; Dr. Eduardo Gonzalez Murguia, Mexican Treasurer; Dr. R. E. Hastings, American Treasurer; Dr. Michael Carreras, American Secretary; and Dr. E. Contreras Reyna, Mexican Secretary.

The next meeting will be held in Guadalajara on November 8th, 9th and 10th, 1960, then moving to Mazatlan on November 11th and 12th. Those of you who were at the meeting held in Guadalajara two years ago and Mazatlan four years ago, will remember the most active and interesting meetings that this Society has ever enjoyed. I hope that everyone will make their plans to be there, both at Guadalajara and at Mazatlan. Those of you wishing to give papers should forward your requests to the Secretary of this Society.



When too many tasks
seem to crowd
the unyielding hours,
a welcome
"pause that refreshes"
with ice-cold Coca-Cola
often puts things
into manageable order.

DRINK
Coca-Cola
REG. U.S. PAT. OFF.

Topics of Current Medical Interest

DAILY POLLEN COUNT NOW AVAILABLE IN SALT RIVER VALLEY

Representing a first service of its kind in Central Arizona, a daily pollen count is now available and being distributed to physicians through a joint program of the Greater Arizona Chapter, Allergy Foundation, S-K Allergy Research Laboratories, Inc., of Phoenix, and David L. Walkington, M. S., botanist, of Arizona State University, according to Dr. Chas. W. Vivian, chapter president.

Mailed thrice weekly, recordings include pollen grains and fungous spores generally found in the Salt River Valley at different times of the year, the chart includes a daily weather report.

Statistics are compiled by Walkington from slides exposed on the roof of the University's Life Science Building and give a 24 hour average.

To acquaint the medical profession with the service, and as a contribution to the chapter, Stehpen C. Shadegg, of S-K Allergy Research Laboratories is mailing the count free to hundreds of physicians in the Valley for a few months period.

Anyone else desiring the count, Dr. Vivian stated, should contact the Allergy Chapter office, located in the Farm & Home Life Building, 2225 N. 16th Street, Phoenix, Tel. AL 8-7951.

Physicians not needing the count are requested to notify the chapter office or S-K Research Laboratories as the cost of gathering and distributing statistics is heavy, Dr. Vivian informed.

The Allergy Foundation of America is dedicated to research in the field of asthma, hay fever, and other allergic diseases, to promote better understanding of the problem to the public, to expand community services, and to provide the medical profession with helpful information.

To carry out these objectives the Greater Arizona Chapter was formed last year and represents the second chapter chartered in the nation by the Allergy Foundation of America.

AIR POLLUTION IN ARIZONA

II. THE METEOROLOGICAL ASPECTS

By Robert D. Smith, Jr., M.A.
Science Instructor, Scottsdale High School

Based on common observation and experience it is generally known that there is a close relationship between weather and air pollution and that the amount of contaminants discharged into the air may be rather constant. The degree of air pollution over an area will vary greatly.

There are three variables that govern the behavior of contaminants at their source. They are wind direction, speed, and turbulence. Wind direction will determine the area of concentration of the pollute while the wind speed will vary the actual saturation in an inverse ratio. Turbulence is very important as it diffuses the foreign matter and affects the fallout rate. With a turbulent wind blowing at considerable speed, diffusion is vastly greater than the rate of molecular dispersion in more stable or static condition.

Most of us are familiar with turbulence for it is the force that causes the bumpy ride in an airplane. The absence of turbulence rewards the airline passengers with a smooth and enjoyable flight. Turbulence in the upper air can be compared with gustiness on the ground and both interacting will reduce or prevent air pollution.

The U. S. Weather Bureau analyzes cross-sectional atmospheric soundings several times daily to determine temperature and humidity readings aloft. These soundings are then plotted on a graph which shows to a great degree of accuracy the condition of stability of the air overhead and it is from these diagrams the atmospheric turbulence or gustiness can be forecast.

Atmospheric turbulence is known to vary considerably by the variations in the vertical temperature gradients within the atmosphere. One of the basic concepts of meteorology and air pollution is this fundamental relationship between the temperature gradients and atmospheric stability. It has been found that there is a definite decrease in temperature with height. This decrease is called the temperature time. Frequently, a wind, probably caused by lapse rate. However, on occasions the lapse rate can, and does, increase with height forming a thermal barrier or lid over the surrounding area which it covers.

Under normal daytime conditions, the temperature lapse rate decreases with height at an average value of 5 degrees F. per thousand feet of elevation. This gradient is technically referred to as the dry-adiabatic lapse rate. On a clear day when there is a profuse amount of sunshine heating the air very near the earth's surface, this lapse rate often becomes super-adiabatic, i.e., the temperature falls or decreases at a rate greater than the normal dry-adiabatic rate. This is brought about by the hot ground surfaces heating the air directly by contact. When this occurs, excessive turbulence is evident and the atmosphere is now in a state of instability. This is due to the fact that there is a layer of cooler air above warm or hot air which is held next to the ground. This condition exists quite frequently here in the desert southwest during the summer season and hence it is easy to comprehend why dusty breezes and winds are so common on a hot day. The winds and breezes are nature's way of trying to equalize this unstable condition within the atmosphere.

On the other hand, when there is a clear night with little or no winds, the surface of the earth is cooled by nocturnal, longwave ground radiation. In this situation, the air is cooled by the ground as it is a well known fact that the ground will lose its heat faster than the air. Under these conditions, the lapse rate can become relatively constant, or isothermal, indicating that the temperature aloft will remain the same with a change in altitude. On oc-

TABLE I
COMPARATIVE TABULATION OF AREAS AFFECTED BY AIR POLLUTION

Features	*Phoenix*	*West Coast*	*East Coast*
1. *Natural Effects:*			
a. Deterioration of paints, colors, etc.	Less known	Well known	Well known
b. Eye irritation	Reported on occasions	Frequent	Known
c. Oxidation of metals, stone, etc.	Less known	Well known	Well known
d. Soiling by particulates	Well known	Less pronounced	Well known
e. Atmospheric visibility during occurrance	5-10 miles	2-5 miles	2-5 miles
f. Seasonal occurance	Winter	All year	Fall and winter
2. *Fuel Burned:*	Hydrocarbons (gas)	Hydrocarbons (gas)	Hydrocarbons (coal - oil - gas)
3. *Humidity:*	Low to moderate	High	High
4. *Surface Sunlight:*	Reduced	Absent during attack	Absent during attack
5. *Time of Attack:*	Early mornings	Anytime	Anytime
6. *Chemicals Present:*	Sulphur Dioxide	Ozone	Sulphur Dioxide
7. *Desert Particulates:*	Abundant	None	None

casions, when the air is very calm, the temperature may even increase with height above the surface of the earth. This will create a condition known as an inversion layer. This type of air stratafication is a very stable condition and turbulence is at a minimum under these circumstances since the cold, heavier air is under a blanket of warm, lighter air.

This inversion layer behaves just like a lid or blanket over the cold air. This condition is very conducive for a local attack of air pollution since there is no pronounced air movement in any direction. Since the sunlight is reduced in intensity by the pollution, no large-scale convection currents are active which would aid in the dispersion of the pollutants. The air and all of the contaminants are trapped under this lid or inversion until some new meteorological condition will disperse the polluted air. This new meteorological condition might be in the form of a weather front or the formation of a wind-producing high or low pressure area. At any rate, a city with a pollution attack is faced with the problem for what could be a period of several hours duration to several weeks.

During the periods of calm weather when an inversion is present, the pollutants discharged into the atmosphere will tend to accumulate. The degree of pollution depends on the duration of the inversion, size of the area affected, and local conditions favoring pollution such as the industrial development of a city. Of course, topography will play an important role in many specialized cases such as the Los Angeles area. This area can be likened to a basin where the air is trapped or confined for an indefinite period of time. The author has deliberately avoided the use of the word "basin" as most laymen link the word with air pollution. Such is not the case here in Arizona and many other areas affected by air pollution. While it is true that air circulation is limited in the Phoenix-Tucson areas, it is not topographically trapped as you would find in a true basin like the Los Angeles area. The pollution attacks in Arizona frequently do not last more than a day at a convection currents, will disperse a great quanity of the pollutants by mid-afternoon provided the rate of discharged material does not exceed the dispersal rate.

The enclosed table quickly informs the reader of the basic differences in air pollution from region to region. It should be noted, however, that the regions represent several cities, each with their own characteristic air pollution problem. This table merely represents an averaging of data to simplify the summation.

Next month, the economic and legislative aspects of the problem will be discussed.

FLUOTHANE

Fred Landeen, M.D.

Fluothane: 2 Bromo, 2 Chloro, 1, 1, 1, Tri-Fluorothane

ACTION AND USES:

VOLATILE, non-flammable liquid. Its potency is approximately four times that of ether. This potency allows a narrow margin of error and therefore it is to be administered only by trained anesthetists and with equipment designed for its use.

Induction is smooth and rapid, the vapors are not unpleasant and with very little irritation to mucous membranes. Induction is achieved by vaporizing Fluothane with a flow of N20 and O2 in a nonrebreathing or partial rebreathing system. The usual complications, such as coughing, laryngospasm, etc., are uncommon. With concentration of 2 per cent to 2.5 per cent surgical anesthesia is induced in two to 10 minutes. Intubation can be done early as muscle relaxation is excellent and reflexes obtunded early, but because of the rapidity with which the anesthesia plane is lightened, intubation must be done swiftly.

Induction hypotension is sometimes seen, but usually stabilizes as soon as the concentration of Fluothane for maintenance is established. The reason for the hypotension is a moot point.

On induction, there is a depression of the respiratory minute volume and therefore assisted or controlled respiration should be used, but the patient should be watched carefully for overdosage. Sudden exposure to high concentration can lead to profound hypotension and cardiac arrest.

Fluothane sensitizes the myocardium to epinephrine and like compounds, and not infrequently produces alterations of cardiac rate

and rhythm.

Maintenance is smooth and relaxation is moderately good, but succinyl choline 0.1 per cent drip is necessary for good to excellent relaxation.

D-Turbo Curare has been known to cause profound and irreversible hypotension.

Capillary oozing seems to be less with Fluothane.

A rapid, free from excitement recovery is seen with this drug, and the incidence of nausea and vomiting is low.

Administration should be restricted to qualified anesthesiologists, and in selected cases. It is especially valuable where electrocautery is to be used, and a general anesthetic is needed.

DOSAGE

Fluothane is given by inhalation in concentrations of 0.5 per cent to 4.0 per cent – usually in a nonrebreathing system. Induction is accomplished by a 2.0 per cent to 2.5 per cent concentration and maintenance by 0.5 per cent to 1.5 per cent concentration.

It is especially important that an anticholinergic drug be used in premedication of the patient to minimize bradycardia.

PREPARATION:

Liquid (inhalant) 125 cc., Ayerst Laboratories.

COMMENT:

I have used this agent for approximately 400 cases – no deaths and few complications. At first, with being unfamiliar, hypotensions and bradycardia due to overdosage did occur. But now that we maintain patients at *not over* 1.5 per cent and control relaxation and respiration with succinylcholine there have been few or no serious side effects. Premedication is usually with a narcotic and an anticholinergic drug – (usually meperidine and atropine or hyoscine) and occasionally an ataractic agent.

Recovery is rapid and the incidence of nausea and vomiting is low.

This is a very difficult agent to use because of the narrow margin of safety and should be used only by highly trained individuals or under strict supervision.

Reprints

The Statistical Investigation of Smoking And Cancer Of The Lung *

Joseph Berkson, M.D.

Sections of Biometry and Medical Statistics
Mayo Clinic
Rochester, Minnesota

"Don't think, but try." – John Hunter's advice to Jenner.[31]

"The second purpose that the statistical method has been called upon to accomplish is the prediction of the individual case from a precise knowledge of the group or mass. . . . We have seen that this kind of statistical method gives only a somewhat sterile kind of knowledge so far as concerns individuals, namely, a knowledge of betting odds. . . . Its place in the methodology of science is not an independent one. By it alone one cannot discover new truths about phenomena. But it is a highly important adjunct to other modes of research." – Raymond Pearl.[35]

According to innumerable accounts published in newspapers, magazines, and some scientific periodicals of England and the United States, it has been conclusively established that smoking is an important cause of cancer of the lung. So firmly, and even fanatically, is this opinion held in some quarters that to question it is to court the charge of being biased, surreptitiously a partisan of the interests of the "tobacco trust," indecisive where "action" is wanted, an obstructor of scientific and medical progress, or simply obstreperous. Such attacks are not pleasant to receive, as I know from personal experience, but they are not fatal. Repeated, they incite a certain immunity. So I survive to appear before your society, privileged with the opportunity to present some reasons for doubting this conclusion.

As I suppose you know, the theory that smoking causes cancer of the lung is derived from statistical studies. It had been noted in the vital statistics of several countries that the recorded death rate from cancer of the lung had increased greatly in the last several decades. Since smoking had increased during this same period, it was hypothesized that the increased deaths from cancer of the lung had been caused by smoking. Explicitly, the theory as it has been set forth is that tobacco smoke[29-30] contains benzpyrene and arsenic, both known to be carcinogens, and possibly other carcinogenic substances, and that inhaled with the tobacco smoke, these carcinogens produce cancer by acting directly on the pulmonary tissue.**

---

*Reprinted from Proceedings of the Staff Meetings of the Mayo Clinic 34:206-224a (April 15) 1959.

†This paper is based on an address presented at the Federation Internationale Pharmaceutique, Brussels, September 10, 1958.[4]

**In some presentations such as that of Doll, Hill and Kreyberg,[12] and that of a "Study Group,"[38] the theory that smoking causes cancer of the lung is confined solely or mainly to the squamous or epidermoid type of cancer.

The most definitive of the statistical investigations that have been conducted are of a type which has been called "prospective," and the most notable of these that have been published are two studies, one by Doll and Hill[10-11] in England, and the other by Hammond and Horn[20-21] in the United States. In a prospective study, a group of individuals, necessarily a large group, are questioned by circular as to whether or not they smoke, in what form, how long, and so forth. Then, by one means or another, the death of any individual of the group is ascertained, and the cause of death is abstracted from the death certificate. The death rates from cancer of the lung of the various classes of smokers can then be computed and compared.

The group used by Doll and Hill for study consisted of the physicians listed in the British Medical Registry. They obtained for study in this way some 35,000 men with satisfactorily completed questionnaires. Hammond and Horn secured the co-operation of some 20,000 volunteer workers of the American Cancer Society, each of whom was requested to obtain the smoking records of 10 men acquaintances in the age range 50 to 70 years. They secured for study in this way a population of about 188,000 men, and a complete follow-up record on virtually all of them.

Reports have been issued on each of these prospective studies, incorporating about 4 or 5 years of experience. Both studies supported the hypothesis that smoking causes cancer of the lung, insofar as each showed that the death rate from cancer at this site was higher among smokers, in particular cigarette smokers, than among nonsmokers. Moreover, when the cigarette smokers were studied in relation to the amount they smoked, there was a regular progressive increase of death rate from cancer of the lung corresponding to progressive increase in the amount smoked. These results, considered together with previous less definitive but nevertheless indicative results in the same direction, were taken virtually to prove that smoking causes cancer of the lung. Why then, in the face of these findings, do I say that I have doubt of the validity of this interpretation?

This is what I shall now try to explain. Soon after the first report of Hammond and Horn,[19] I[2] published a critical appraisal of it, as well as of the first report of Doll and Hill. I was a member of the Committee of Research and Statistics of the American Cancer Society, from which the project of Hammond and Horn had been launched, and under whose formal supervision it was conducted. While the work itself, and all credit for its conduct and results, properly belonged to my friends Dr. Hammond and Dr. Horn, I felt some responsibility for its critical review. I felt very strongly that to announce definitely, on the basis of these statistical results, that smoking causes cancer of the lung, as many commentators did, was premature. For one thing, the question of the cause of cancer is basically a biological, not a statistical problem, and the statistical conclusions would have to be fully corroborated by experimental and direct observational studies before they could be considered to have been scientifically established. There was, in fact, virtually no substantial clinical, pathologic, or other independent direct evidence that smoking was the cause of cancer of the lung.[2] But, to the present point, there were some particular aspects of the reported statistics that raised serious questions regarding the assured, simple interpretation that had been given to them. The general and specific death rates, particularly in the study of Hammond and Horn, were low compared with corresponding death rates for the general population. For instance, the death rate from cancer of the lung among the smokers, though it was larger than that of the nonsmokers of the sample population, was lower than the death rate from cancer of the lung among the general population. Similarly the relative number of smokers was low in comparison with available statistics for the comparable general population. It appeared quite evident that the sampled populations studied were not representative of the reference populations from which these samples were drawn. I pointed out that, in such selected samples, a spurious statistical association could be produced by a mechanism with which I was familiar from grievous experience of my own. There was, however, another point, and it is the important one so far as the present analysis is concerned.

I have said that both studies showed an increasing death rate from cancer of the lung associated with an increase in the amount of cigarette smoking. But in the study of Hammond and Horn, which is by far the more ample of the two reviewed, this was by no means all that

the study showed, as I shall exhibit in figure 1. Hammond and Horn segregated the causes of death into four groups: cancer of the lung, cancer other than that of the lung, coronary heart disease, and other diseases. In the figure is presented the age-adjusted death rate for each of these causes for each of three groups classified according to the amount of smoking of cigarettes. Surely, it is true that there is a graded increase of the death rate from cancer of the lung with increase of amount of smoking. But equally surely, there is an increase of death rate, with an increased amount of smoking, in each of the other three categories of disease into which all causes of death had been segregated. This observation prompted me to remark in the publication I have referred to, "the question raised by the findings in the American Cancer Society study . . . is not, 'Does cigarette smoking cause cancer of the lungs?' so much as it is 'What disease does cigarette smoking not cause?'" We are presented with findings that bear no particular relation to the specific increase of death rate from cancer of the lung observed in vital statistics records, nor to benzpyrene or arsenic or other substances in tobacco smoke acting as contact carcinogens. Something very different is on view here than was originally envisaged to explain the rise in death rate from cancer of the lung.

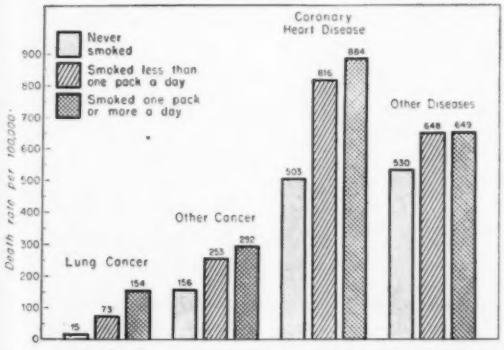


Fig. 1. Study of Hammond and Horn.[10] Relation of mortality to amount of cigarette smoking. Rates per annum, adjusted for age to total population. The rates increase steadily with amount of smoking, not only for cancer of the lung, but for each of the other categorized disease groups.

I believe that, among objective students of the problem, the emergence in the statistical data of a generalized association with many diseases was recognized as a serious difficulty for the developed theory identifying smoking as a cause of cancer of the lung. Korteweg[24] published a commentary devoted specifically to my paper. He acknowledged the relevancy of my point about the multple associations with diseases other than cancer of the lung, and also the validity of my point about selective association. He then ingeniously used one to negate the other! He made some reasonable arithmetic calculations to show that the spurious selective association which I had postulated could account for the associations observed in the disease categories other than cancer of the lung, and possibly heart disease, but that the ratio of death rate from cancer of the lung of smokers to that of nonsmokers was too large for the association to be explained in this way. We need not stop to examine the cogency of Korteweg's analysis, for the points to note here are only that a serious difficulty was recognized in the existence of the association with many classes of disease, and that Korteweg's resolution of it rested on the presence in the data of unrepresentatively low death rates. We can then pass to the second report of Hammond and Horn[20-21] and of Doll and Hill.[11]

In the second report of Hammond and Horn, the over-all death rates had increased, although they were still appreciably lower than those of the general population of the same age. The general death rates of the study of Doll and Hill also were larger in their second report than in their first. This was understandable. The population had originally been recruited from persons in relatively good health; persons who were ill in hospitals or ailing at home were excluded either deliberately or because they did not volunteer to rely to questionnaires. Since the general population does contain such individuals, the general death rates were understandably higher. With the passage of time the death rates of the groups studied could be expected to approach the general rates, and they did. Now, if the selective association which I had postulated were strongly operative in the data of the first report, since it depended on the presence of selectively low death rates, then, since these rates had increased in the data of the second reports, the association of smoking with death rate from cancer of the lung, on the postulated theory, should have been diminished. It was not; if anything it was found to be more clearly shown. But so were the associations with other diseases equally or more clearly shown. So the force of my own point regarding the possible spuriousness of the lung-cancer association, as well as Korteweg's

point regarding the spuriousness of the other associations, as arising from the selective association postulated, was weakened by the results presented in the second reports.

Figure 2 is reproduced from Hammond and Horn's second report. It represents the excess deaths among the smokers, that is, the difference between the number of death observed among them and the number of what are called the "expected deaths." The last represent the number of deaths that would have occurred among the smokers, had their age-specific death rates been the rates observed among the nonsmokers. It will be noted that these excess deaths, reflecting the higher death rate for smokers in comparison with nonsmokers, are not limited to cancer of the lung. In fact only 13.5 per cent of these excess deaths are due to cancer of the lung, while 86.5 per cent are due to causes other than lung cancer. Thirteen and a half per cent, the same percentage as for cancer of the lung, were due to cancer other than cancer of the lung. By far the largest proportion of the excess deaths was attributed to coronary heart disease, but all classes of disease are included in the association.

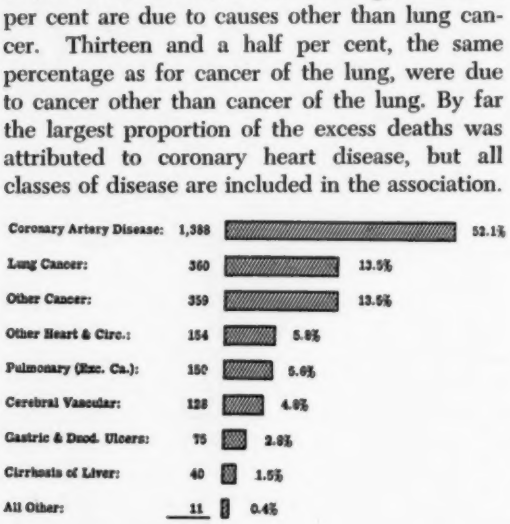

Coronary Artery Disease: 1,388 52.1%
Lung Cancer: 360 13.5%
Other Cancer: 359 13.5%
Other Heart & Circ.: 154 5.8%
Pulmonary (Exc. Ca.): 150 5.6%
Cerebral Vascular: 128 4.8%
Gastric & Duod. Ulcers: 75 2.8%
Cirrhosis of Liver: 40 1.5%
All Other: 11 0.4%
Total 2,665

Fig. 2. From study of Hammond and Horn.[21] The number of excess deaths from various causes attributed to regular cigarette smoking, with the percentage of total excess deaths for each cause listed. All categories of cause of death show excess deaths among regular smokers; lung cancer accounts for only 13.5 per cent.

The data of the first report of Doll and Hill did not show, or at any rate did not show so clearly, an association of smoking with death rates generally, as did the report of Hammond and Horn. In the second report of Doll and Hill, for which they had additional data accumulated since their first report, using regression analysis,* they found association with cancer of the lung to be clearly shown, but they found also a suggestion of some association with a particular group of diseases which they considered as possibly related to smoking.

However, when the data as presented by Doll and Hill (which were still sparse as compared with those of Hammond and Horn) were examined from another view, a more generalized association could be observed. If we wish to discern evidence of an influence of smoking on death rate from some specific disease, we may follow a simple method frequently used, which is to examine an extreme, in the present case the extreme of heavy smoking. It is reasonable to say: "If smoking increases the risk of death, it should affect heavy smokers most; the first thing to do is to see whether the death rates of the heavy smokers are higher than the rates of those who are less than heavy smokers."

If the data of Doll and Hill[11] are examined in this way an association of smoking with disease generally is clearly indicated. Doll and Hill divided all diseases into five categories and presented data for four groups of individuals classified in respect of amount of smoking. In figure 3 the difference between the death rate for heavy smokers and each class of less than heavy smokers, namely nonsmokers, light smokers, and moderate smokers, is shown for each of these categories of cause of death. It is seen in the top line of columns that the heavy smokers have a larger death rate than the nonsmokers for each class of cause of death, and that the largest difference is not for death from cancer of the lung, but for death from coronary heart disease. In the next line a similar comparison is made with the death rates for light smokers, and here again the heavy smokers are seen to have the higher death rate for each class of disease, the largest

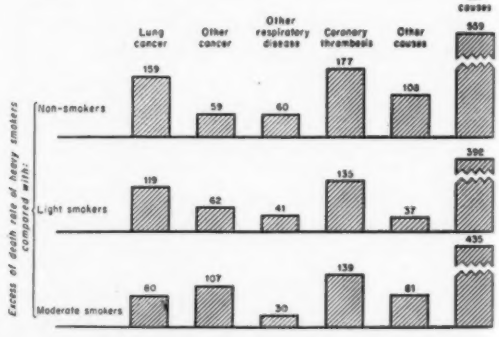


Fig. 3. From data of Doll and Hill.[11] Difference between death rate (per 100,000, standardized) for heavy smokers and for each class of less than heavy smokers, for five disease categories. The heavy smokers have a higher death rate for each category of disease; the largest difference is for deaths from coronary thrombosis.

*With a decisive dependence on the x^2 test of significance, and with what seems an insufficient regard for errors of the second kind.

difference corresponding not to cancer of the lung, but to coronary heart disease. The comparison with the moderate smokers shown in the bottom line is similar, the heavy smokers showing the higher death rate from each disease category while the largest difference is for coronary heart disease, and even the next largest difference is not for deaths from cancer of the lung, but deaths from cancer other than cancer of the lung. Examined in this way, by comparing the death rates of the heavy smokers with those of less than heavy smokers, the data of Doll and Hill confirmed the finding in the study of Hammond and Horn of an association of smoking with death rate from disease in general.

I wish now to refer to a study the results of which have not yet been formally published. This is a prospective study also. The population investigated is that of United States veterans who have insurance policies registered with the Veterans Bureau. Under the direction of Dr. Harold Dorn of the United States Public Health Service, the individuals in the insured group were canvassed as to their smoking habits, and on the occasion of a death claim, the record of death and the necessary data from the death certificate were transferred to the primary records. The total number of the population studied is about 245,000, larger even that that of the study of the American Cancer Society. A preliminary report[13] on the results so far recorded for a 2½-year period of experience was prosented at a recent conference on cancer held in London, and a brief summary with a few tables has been made widely available.

It was possible to extract data from this summary to prepare a graph of the same instructive type as was presented by Hammond and Horn. This is shown in figure 4. The total "excess deaths" are shown distributed among various causes of death grouped in the same categories as used by Hammond and Horn. It will be noted that these excess deaths are not limited to deaths with cancer of the lung, which in fact account for only 12.7 per cent of the total excess deaths.* The distribution of the excess deaths is, in detail, very similar to that shown in the results of Hammond and Horn. Dorn's report presents a tabulation which lists 26 specific disease groups — cancer of specific organs and noncancerous diseases. For 22 of these 26 diseases, the death rate was higher among regular smokers of cigarettes than among persons who had never smoked or had used tobacco only occasionally. In table 1, I present a comparison of the distribution of excess deaths in the two studies. It is seen that, in both studies, by far the largest number of excess deaths is from causes affecting the cardiovascular system, which account for 62.7 per cent in the study of Hammond and Horn, and 61.4 per cent in the study of Dorn. The proportion of excess deaths due to cancer of the lung is 13.5 per cent in the study of Hammond and Horn, and 12.7 per cent in the study of Dorn. For excess deaths from cancer other than cancer of the lung the proportions are respectively 13.5 per cent and 9.0 per cent. Examination of the rest of the figures discloses that the results in both of these large studies are closely similar.

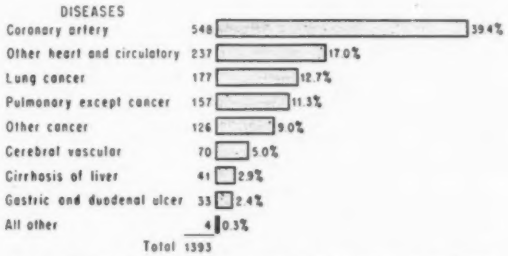

DISEASES
Coronary artery 548 39.4%
Other heart and circulatory 237 17.0%
Lung cancer 177 12.7%
Pulmonary except cancer 157 11.3%
Other cancer 126 9.0%
Cerebral vascular 70 5.0%
Cirrhosis of liver 41 2.9%
Gastric and duodenal ulcer 33 2.4%
All other 4 0.3%
Total 1393

Fig. 4. From data of Dorn.[13] Excess deaths from various causes among regular cigarette smokers, over deaths among nonsmokers or only occasional smokers, with the percentage of total excess deaths for each cause listed. All categories of cause of death show excess deaths among regular cigarette smokers; cancer of the lung accounts for only 12.7 per cent.

It appears to me that hardly can there longer be any serious doubt that the definitive important finding of these statistical studies is not that there is an association between smoking and cancer of the lung,** but that there is an association between smoking and deaths from all causes generally.*** Indeed, it is hard to believe that the findings reported in these prospective studies would have been taken to indicate that smoking causes cancer of the lung, had the studies been made independently, that is, if they had not been projected to investigate the

*In Dorn's tabulation, contributory as well as underlying causes recorded on the death certificate are included. Figure 4 therefore refers to deaths "with" a record of the specified cause, rather than "from" this cause.

**We recall, moreover, that in some presentations the putative association was confined to the epidermoid type.[12-38]

***It is noteworthy that the definitive final report of the investigation of the American Cancer Society[21] says in summary: "The most important finding of this study was the high degree of association between cigarette smoking and total death rate."

theory that smoking is the cause of the observed rise in the death rate from cancer of the lung. The observations made in these investigations are not those which were anticipated, if the theory was to be confirmed. They do not contradict that theory, but they go so far beyond the expected findings that one might say they almost disprove it, because they "prove too much."

What interpretation then is to be given to them? Certainly I am not prepared to say with any degree of confidence. These stastical findings reflect an extraordinary and novel phenomenon, whatever the real nature of that phenomenon is. One point seems elementary as a well-established rule of sound scientific reasoning: We should seek a unified explanation for the general association observed. That is, we ought not give one hypothetical explanation for the association of smoking with cancer of the lung, another for the vascular diseases, another for cancer of the bladder, another for cancer of the stomach (if one can be found), another for cirrhosis of the liver and so forth, for a certain number of specified diseases, and leave the association with many (or most) diseases unexplained as for the present, to be clarified later, perhaps. To do this would violate the fundamental rule, sometimes referred to as "Occam's razor," and epitomized in Newton's[7] famous "rules of reasoning": 1. We are not to assume more causes than are sufficient and necessary for the explanation of the observed facts. 2. Hence as far as possible similar effects must be assigned to the same causes.

Table 1
Excess Deaths Among Regular Cigarette Smokers
Percentage of Total, by Cause of Death
Comparison, Data of Hammond and Horn, and of Dorn

Cause of death, diseases*	Per cent of total	
	Hammond and Horn[23]	Dorn[12]†
Coronary artery	52.1	39.4
Cerebral vascular	4.8	5.0
Other heart and circulatory	5.8	17.0
Total cardiovascular	62.7	61.4
Lung cancer	13.5	12.7
Cancer other than lung cancer	13.5	9.0
Pulmonary except cancer	5.6	11.3
Gastric and duodenal ulcer	2.8	2.4
Cirrhosis of liver	1.5	2.9
All other	0.4	0.3
Total, all causes	100.0	100.0

*Categories of Hammond and Horn.
†Includes underlying and contributory causes of death.

I[3] have ventured to suggest three explanations for consideration:

The first is that the associations are a spurious statistical phenomenon, related to the vagaries of the data of smoking history and cause of death, as they are obtained in these statistical studies. I imagine that some may consider this an irresponsible suggestion. Nevertheless, I make it seriously. I will point out (a) that the datum of smoking history is subject to wide variation, even under what are supposed to be controlled conditions, as I shall attempt to demonstrate in a projected paper; (b) that the datum of cause of death as recorded on death certificates may be subject to arbitrary variation of dimensions which would appear incredible to those who are unacquainted with their study;[40] and (c) that in none of the investigations referred to does the sample studied constitute a really adequately large proportion of the reference population. In the study of Doll and Hill, less than 70 per cent of the physicians canvassed replied with usable questionnaires. In the study reported by Dorn, 83 per cent were procured. As regards the study of Hammond and Horn, because the reference population is not definable, the proportion is undeterminable. In contrast with these figures, I may remark that in serious hospital studies set up to ascertain survival rates, a 100 per cent or close to a 100 per cent coverage of the population studied is regularly required.[6-28] Precisely how the variability of the data, with existing biases, may have produced the observed associations I shall not try to say,* but the findings are unexpected — even strange, and without known physical basis. I am old-fashioned enough to think that, even with what may seem to be adequate statistical control, unreliable data must always be considered capable of producing erroneous results.†

The second explanation is that the association has a constitutional basis. The suggestion is that persons who are nonsmokers or relatively mild smokers are constitutionally disposed to longevity, and therefore to generally low death rates, and that the disposition of these individuals not to smoke is a reflection of this constitution.

*See Note 3 following the present text.
†One should agree with Bradford Hill,[23] however, that one should not go so far as to say "Lies, dammed lies, statistics"!

There are several independent studies which support the premise of this theory that smokers, as a class, are of different general constitutional type than nonsmokers. Two of these demonstrate,[22-26] that smokers and nonsmokers are of different psychologic types, as revealed by their replies to psychologic questionnaires and personality studies, and one[39] that the parents of smokers are more frequently affected by heart disease than are the parents of nonsmokers. R. A. Fisher,[15-16] in two small but basic studies comparing the smoking habits of monozygotic and dizygotic twins, has brought forward evidence of a genetic element of difference between smokers and nonsmokers.

The third explanation relates to a concept of the late Raymond Pearl[34] which he called the "rate of living." In this conception, there is a basic limited amount of vital energy with which an individual is endowed at birth, and from which he must draw for maintenance of life. The more physically active the individual, the more rapidly is this store expended, and the shorter is the duration of life. We may speculate that normal aging is the physical expression of this depletion. It is conceivable that smoking speeds up the normal process of aging. Increasing age increases the death rate from diseases generally, and in current times it increases the death rate from cardiovascular diseases and cancer especially. Perhaps the effect of smoking is to increase the tempo of biologic processes, and so to increase the biologic age of the affected tissues. If some such effect is real, it is reasonable to assume that other biologic processes, including mental processes, not just those affecting aging, are stimulated and a resulting increase of vitality may in this respect be considered salutary. Of course, all this is highly speculative. There are no constituents of tobacco smoke which have been observed to have such generalized effects, nor do we know what the mechanism could be for such a profound influence on fundamental biologic processes.

But for a scientist, the important aspect of a theory is not how plausible it appears, but what experiments it suggests for verification. This theory is not tested by applying the products of tobacco smoke in very high concentration to specific tissues and making observations to see whether cancer develops at the locus of application. Such experiments are, of course, essential, and it is of the first importance that they be thoroughly pursued, but they have had very equivocal results.[33*] Experiments have been done also, in which animals have been caused to inhale cigarette smoke for long periods, in an attempt to produce a bronchogenic type of lung caner, but so far these have all given negative results, that is, such cancers have not been produced.[8-25-27-33] But another type of experiment is suggested by the results of the prospective studies, for those show a generalized, not a specific localized effect. If the associations that have appeared in the statistical studies reviewed are not spurious, and if they are not the reflection of a general constitutional difference between smokers and nonsmokers, but reflect some active process that has a generalized effect, then the appropriate experiment is in the field of experimental epidemiology. It should employ large numbers of animals, on which one would make systematic observations referring to such biologic variables as growth rates, activity rates, and death rates from different causes of what may appear as "normal" deaths. This brings to mind some famous experiments of Greenwood, Hill, Topley and Wilson.[17] However, while in those experiments the interest was in the mode of spread of infectious diseases, in the experiments projected the interest would be in the incidence of trophic or so-called chronic degenerative diseases, which are characteristic of aging.

Now I have completed my paper which was necessarily brief. I apologize for what must have seemed a curious discourse to those who are unfamiliar with the voluminous literature on smoking and cancer of the lung which has been circulating in the United States and in England. I do not know how much of this literature has reached the Continent. Perhaps it has not penetrated the pharmacologic journals of your societies, or perhaps it has, or if not, perhaps it will. If it resembles much that has appeared in my country, it may seem that the subject is virtually closed, and that the statistical studies which have been completed prove that smoking causes cancer of the lung. If you will remember, from my presentation, that serious question of this conclusion has been raised, even if you do not highly regard the specific suggestions I have made, then I shall be satisfied that a useful purpose has been achieved.

*It appears that designed statistical controls such as, for example, those used by Irwin[23a] in experiments on the carcinogenic action of mineral oils were not used in any of these experiments.

NOTE 1

Computation of a Measure of the Mortal Effect of Smoking

In the analysis of the death rates of heavy smokers and less than heavy smokers, from the data of Doll and Hill shown in figure 3, the absolute difference between the respective death rates is used for the comparisons. For instance, the death rate (per 100,000 per annum) from all causes among heavy smokers was 1884, and the death rate among nonsmokers was 1325; so 559, the difference between these is the figure plotted to represent the excess of death rate from all causes among heavy smokers. In a recent article Dr. Mindel Sheps[37] criticizes this computation. She says ". . . the difference – namely 559 additional deaths – has little meaning unless it is related to the number of potential survivors." She divides the 559, by the remainder of 100,000 minus 1325, and obtains 567 instead of 559 per 100,000 as the proper measure of the harmful effect of heavy smoking in respect of death from all causes.

Dr. Sheps' development is heuristic, and may be oversimplified, but the formula she arrives at is sound enough.* It has many applications in statistical practice, for example in accounting for natural mortality in bioassay[14] where it is called "Abbot's formula," and in estimating the net force of cancer mortality in the computation of survival rates for cancer patients.[1,5] It may be explained in terms of a simple example. Suppose one marksman, when shooting alone, has a striking rate of 10 per cent (q_1), and a second marksman, when shooting alone, has a striking rate of 20 per cent (q_2). Then if both shoot, and assuming they do not affect each other's marksmanship, what percentage of the targets will be struck? The answer is not 30 per cent! Since $.10 \times .20 = 2$ per cent of the targets will be struck by both marksmen, only 28 per cent of the targets will be struck. If q_1 is the net risk from one factor, and q_2 is the net risk from another factor, then Q, the total risk with both operating, called the crude risk, is given by

$$Q = q_1 + q_2 - q_1 q_2 \qquad (1)$$

If, now, we observe q_1, say the natural death rate among nonsmokers expressed as a probability, and Q, the death rate among heavy smokers, then the net effective death rate attributable to heavy smoking is, from (1),

$$q_2 = \frac{Q - q_1}{1 - q_1} \qquad (2)$$

Thus in the example above,

rate among nonsmokers, q_1, = .01325,

rate among heavy smokers, Q, = .01884, and

$$\text{net rate due to heavy smoking, } q_2, = \frac{.00559}{.98675} = .00567,$$

which, when expressed as per 100,000, is the measure of harmful effect obtained by Dr. Sheps.

It will be noted that formula (2) is the absolute difference, $(Q - q_1)$, divided by a correcting factor, $(1 - q_1)$. If q_1 is small, the factor will be almost unity. In raising the measured effect of heavy smoking from 559 to 567, Dr. Sheps comments "The 'harmful effect' of 567 per 100,000 happens to be nearly equal to the absolute difference of 559 per 100,000 . . . in this example simply because the denominator . . . is so close to 100 percent." Now it "happens" that in the case chosen for illustration by Dr. Sheps –deaths from all causes–the rate is the largest among the categories of causes of death concerned in the comparisons. For the specific categories of causes of death, the rates are even smaller. The computation of the net effective risk due to smoking, from the observed crude risks, in the case of specific categories of cause of death, necessitates more involved computations than for total causes. Applicable formulas are to be found in Neyman's text[22] in the section on "Evaluation of competing risks." A pertinent formula for a particular case, that of evaluating the effect that eliminating a specific cause of death will have on general mortality, was given earlier by Greville.[18] For the present problem we may estimate the net effect of smoking for a specific cause of death (assuming it has such an effect) as follows:

$$q_s = 1 - e^{-\beta_s} \qquad (3)$$

$$\beta_s = \frac{Q'_n}{Q'_t} \ln (1 - Q'_t) - \frac{Q_s}{Q_t} \ln (1 - Q_t) \qquad (4)$$

$$\log (1 - q_s) = \frac{Q_s}{Q_t} \log (1 - Q_t) - \frac{Q'_n}{Q'_t} \log (1 - Q'_t) \qquad (5)$$

where

q_s = net effect of smoking for a specific cause of death,
Q_s = death rate among smokers from the specific cause,
Q_t = death rate among smokers from all causes,
Q'_n = death rate among nonsmokers from the specific cause,
Q'_t = death rate among nonsmokers from all causes,
ln = logarithm to base e, and log = logarithm to base 10.

This formulation reduces to formula (2) in the case where q_s refers to death from all causes. When the death rates are small, q_s is given with close approximation by the absolute difference $(Q_s - Q'_n)$.

In table 2, the hypothetical effect of heavy smoking as measured by the absolute difference of the respective rates, and by the absolute difference corrected, is shown for each of the categories of death concerned. It is to be noted that the corrections leave the absolute differences practically unaffected. We see that, as judged by the corrected as well as by the uncorrected differences, the putative effect of heavy smoking relates to each of the categories of cause of death, and affects coronary thrombosis more than it affects lung cancer. This is in contrast to the impression conveyed by the "mortality ratio," also shown in the table, which leaves the impression that, overwhelmingly, there is a specific effect on lung cancer. The mortality ratio has frequently been used to measure the supposed effect of smoking on death rates. It is notable that Dr. Sheps repudiates the use of this index, even as I had repudiated it in a previous publication.[30] The point seems to merit consideration in somewhat greater detail.

Table 2
Comparison of Heavy Smokers and Nonsmokers (Data of Doll and Hill[13])
Absolute Differences and Mortality Ratios

Cause of death	Death rate among heavy smokers, Q_s probability	Death rate among nonsmokers, Q'_s probability	Absolute difference per 100,000		Mortality ratio,* Q_s/Q'_s
			Uncorrected	Corrected	
All causes	.01884	.01325	559	567	1.4
Cancer of the lung	.00109	.00007	102	102	23.7
Other cancer	.00263	.00204	59	60	1.3
Other respiratory disease	.00141	.00081	60	61	1.7
Coronary thrombosis	.00599	.00422	177	180	1.4
Other causes	.00719	.00611	108	111	1.2

*Various indices and terms for them are employed for what, in respect to the present discussion, may be regarded as equivalent to the tabled quantity. The "standardized mortality ratio" (S.M.R.) refers to the ratio of death rates adjusted to some standard age distribution. The "ratio of observed to expected deaths" is essentially an S.M.R. in which the age distribution of the population of smokers is used as standard.

The prospective studies have been considered as an analysis of experiments performed by nature. One group of persons has smoked, another has not. The first is the experimental group, the second is the control. The experiments would better be done on animals. Suppose we do some!

*See Note 2, following.

*This is not to say that such ratios cannot have operational meaning in some other model than one which assumes that the differences in the observed rates are due to causation or active increase of deaths by smoking. For instance, in a model I[2] presented which explains the observed differences, hypothetically, on the basis of a bias arising from "selective association," the selective effect would be measured in terms of such ratios, for which the formulas are given by Brownlee.[9]

1. We expose a large group N of animals to benzpyrene, a substance suspected of killing animals by causing lung cancer. A group N′ is used as controls. We observe $D_1>0$ deaths from lung cancer among the N exposed, and $D'_1 = 0$ such deaths among the N′ controls. We compute

$q_1 = D_1/N>0$

$q'_1 = D'_1/N' = 0$

As a conclusion of this experiment, we will say that benzpyrene is a mortal toxin. It kills animals by causing lung cancer, and its effectiveness is measured by

$q_1 - q'_1 = q_1$

We will not say that its effectiveness is measured by the mortality ratio

$q_1/q'_1 = \infty$

We suspect that another substance X,[1] is deadly, killing animals by causing diseases other than lung cancer. We perform an experiment as before, but now with the substance X. We observe $D_o>0$ deaths from diseases other than lung cancer among the N exposed, and $D'_o = 0$ such deaths among the N′ controls. We compute

$q_o = D_o/N>0$

$q'_o = D'_o/N' = 0$

We will conclude that substance X is deadly, killing animals by causing diseases other than lung cancer, and that its potency is measured by q_o. If $q_o>q_1$ we will say that the substance X is more effective than benzpyrene. *We will not say that they are equally potent because their mortality ratios are equal*, that is,

$q_1/q'_1 = q_o/q'_o = \infty$

2. Now suppose that we cannot have benzpyrene separately from substance X, because they are available only in a mixture of the two. We perform an experiment as above, but now with the mixture. We observe $D_1>0$, $D_o>0$ among the N animals exposed, $D'_1 = 0$, $D'_o = 0$ among the N′ controls. We compute the crude rates

$Q_1 = D_1/N>0$

$Q_o = D_o/N>0$

$Q'_1 = D'_1/N' = 0$

$Q'_o = D'_o/N' = 0$

If we measure the potency of benzpyrene and substance X respectively by Q_1 and Q_o, we will be in error. These are the crude rates, and they are affected by the competition of the net risks q_1, q_o. To estimate q_1, q_o from Q_1, Q_o we must make an assumption about the time relation of the force of mortality (instantaneous risk) for the net risks. If, with the q's acting alone (net risks), the instantaneous risk, β, for each risk is considered constant over the time period during which the population is observed (a year, say), and they act independently, even in the mixture, then the following are the relationships among the relevant quantities:

$$q_1 = 1 - e^{-\beta_1} \tag{6}$$

$$q_o = 1 - e^{-\beta_o} \tag{7}$$

$$\beta_1 = -\frac{Q_1}{Q_t} \ln (1 - Q_t) \tag{8}$$

$$\beta_o = -\frac{Q_o}{Q_t} \ln (1 - Q_t) \tag{9}$$

$$Q_1 = \frac{\beta_1}{\beta_1 + \beta_o} Q_t \tag{10}$$

$$Q_o = \frac{\beta_o}{\beta_1 + \beta_o} Q_t \tag{11}$$

where the total death rate (all causes) is $Q_t = Q_1 + Q_o$. For small values of q_1, q_o these are given with good approximation by,

$$q_1 \doteq Q_1 \tag{12}$$

$$q_o \doteq Q_o \tag{13}$$

[1]Substance X can be considered to represent the combined effect of many factors.

If $q_o>q_1$ we will say that substance X is more effective than benzpyrene. *We will not say that they are equally potent because their mortality ratios are equal*, that is,

$Q_1/Q'_1 = Q_o/Q'_o = \infty$

3. Now suppose the animals in question are subject to a natural mortality from lung cancer and also from diseases other than lung cancer, and that such deaths, when they occur, are indistinguishable from those due to benzpyrene and substance X. We will assume that for each cause of death, if it were the only existing cause of death, the instantaneous risk is constant over the observation period, and will represent the constant value by β. Then the net risks, that is, the probabilities of death in the unit period, if each cause were acting alone, are:

$$q_1 = 1 - e^{-\beta_1} \tag{14}$$

$$q_o = 1 - e^{-\beta_o} \tag{15}$$

$$q'_1 = 1 - e^{-\beta'_1} \tag{16}$$

$$q'_o = 1 - e^{-\beta'_o} \tag{17}$$

where

q_1 is the death rate from lung cancer caused by benzpyrene,

q_o is the death rate from other diseases caused by substance X,

q'_1 is the death rate from lung cancer resulting from natural causes, and

q'_o is the death rate from other diseases resulting from natural causes.

We will observe as the corresponding crude risks among the controls

$$Q'_1 = \frac{\beta'_1}{\beta'_1 + \beta'_o} Q'_t \tag{18}$$

$$Q'_o = \frac{\beta'_o}{\beta'_1 + \beta'_o} Q'_t \tag{19}$$

where the total death rate is $Q'_t = Q'_1 + Q'_o$
and in the experimental group

$$Q_1 = \frac{\beta_1 + \beta'_1}{\Sigma\beta} Q_t \tag{20}$$

$$Q_o = \frac{\beta_o + \beta'_o}{\Sigma\beta} Q_t \tag{21}$$

where $\Sigma\beta = \beta_1 + \beta'_1 + \beta_o + \beta'_o$ (22)
and the total death rate is $Q_t = Q_1 + Q_o$.
The formulas for recovering q_1 and q_o from the observed rates Q_1, Q_o, Q'_1, Q'_o are

$$\log (1 - q_1) = \frac{Q_1}{Q_t} \log (1 - Q_t) - \frac{Q'_1}{Q'_t} \log (1 - Q'_t) \tag{23}$$

$$\log (1 - q_o) = \frac{Q_o}{Q_t} \log (1 - Q_t) - \frac{Q'_o}{Q'_t} \log (1 - Q'_t) \tag{24}$$

For small values of q_1 and q_o, these are given with good approximation by the differences

$q_1 \doteq Q_1 - Q'_1$

$q_o \doteq Q_o - Q'_o$

If $q_o>q_1$ it means that the substance X, in its action of producing deaths from diseases other than lung cancer, is more effective than benzpyrene in causing deaths with lung cancer. If one used the mortality ratios Q_o/Q'_o and Q_1/Q'_1 to measure the effects of substance X and benzpyrene respectively and if it happened that q'_o was much larger than q'_1, then even if q_o was much larger than q_1, it might appear that substance X is little if at all effective, while benzpyrene is very effective.

This is about what has happened in the discussion of smoking as a cause of lung cancer. Since the natural mortality of lung cancer is relatively low, the use of the mortality ratio, that is, the ratio of the death rate of smokers to

NOTE 1

Computation of a Measure of the Mortal Effect of Smoking

In the analysis of the death rates of heavy smokers and less than heavy smokers, from the data of Doll and Hill shown in figure 3, the absolute difference between the respective death rates is used for the comparisons. For instance, the death rate (per 100,000 per annum) from all causes among heavy smokers was 1884, and the death rate among nonsmokers was 1325; so 559, the difference between these is the figure plotted to represent the excess of death rate from all causes among heavy smokers. In a recent article Dr. Mindel Sheps[37] criticizes this computation. She says ". . . the difference – namely 559 additional deaths – has little meaning unless it is related to the number of potential survivors." She divides the 559, by the remainder of 100,000 minus 1325, and obtains 567 instead of 559 per 100,000 as the proper measure of the harmful effect of heavy smoking in respect of death from all causes.

Dr. Sheps' development is heuristic, and may be oversimplified, but the formula she arrives at is sound enough.* It has many applications in statistical practice, for example in accounting for natural mortality in bioassay[14] where it is called "Abbot's formula," and in estimating the net force of cancer mortality in the computation of survival rates for cancer patients.[1,2] It may be explained in terms of a simple example. Suppose one marksman, when shooting alone, has a striking rate of 10 per cent (q_1), and a second marksman, when shooting alone, has a striking rate of 20 per cent (q_2). Then if both shoot, and assuming they do not affect each other's marksmanship, what percentage of the targets will be struck? The answer is not 30 per cent! Since $.10 \times .20 = 2$ per cent of the targets will be struck by both marksmen, only 28 per cent of the targets will be struck. If q_1 is the net risk from one factor, and q_2 is the net risk from another factor, then Q, the total risk with both operating, called the crude risk, is given by

$$Q = q_1 + q_2 - q_1 q_2 \qquad (1)$$

If, now, we observe q_1, say the natural death rate among nonsmokers expressed as a probability, and Q, the death rate among heavy smokers, then the net effective death rate attributable to heavy smoking is, from (1),

$$q_2 = \frac{Q - q_1}{1 - q_1} \qquad (2)$$

Thus in the example above,

rate among nonsmokers, q_1, = .01325,

rate among heavy smokers, Q, = .01884, and

$$\text{net rate due to heavy smoking, } q_2, = \frac{.00559}{.98675} = .00567,$$

which, when expressed as per 100,000, is the measure of harmful effect obtained by Dr. Sheps.

It will be noted that formula (2) is the absolute difference, $(Q - q_1)$, divided by a correcting factor, $(1 - q_1)$. If q_1 is small, the factor will be almost unity. In raising the measured effect of heavy smoking from 559 to 567, Dr. Sheps comments "The 'harmful effect' of 567 per 100,000 happens to be nearly equal to the absolute difference of 559 per 100,000 . . . in this example simply because the denominator . . . is so close to 100 percent." Now it "happens" that in the case chosen for illustration by Dr. Sheps –deaths from all causes–the rate is the largest among the categories of causes of death concerned in the comparisons. For the specific categories of causes of death, the rates are even smaller. The computation of the net effective risk due to smoking, from the observed crude risks, in the case of specific categories of cause of death, necessitates more involved computations than for total causes. Applicable formulas are to be found in Neyman's text[20] in the section on "Evaluation of competing risks." A pertinent formula for a particular case, that of evaluating the effect that eliminating a specific cause of death will have on general mortality, was given earlier by Greville.[18] For the present problem we may estimate the net effect of smoking for a specific cause of death (assuming it has such an effect) as follows:

$$q_s = 1 - e^{-\beta_s} \qquad (3)$$

$$\beta_s = \frac{Q'_n}{Q'_t} \ln (1 - Q'_t) - \frac{Q_s}{Q_t} \ln (1 - Q_t) \qquad (4)$$

$$\log (1 - q_s) = \frac{Q_s}{Q_t} \log (1 - Q_t) - \frac{Q'_n}{Q'_t} \log (1 - Q'_t) \qquad (5)$$

where

q_s = net effect of smoking for a specific cause of death,
Q_s = death rate among smokers from the specific cause,
Q_t = death rate among smokers from all causes,
Q'_n = death rate among nonsmokers from the specific cause,
Q'_t = death rate among nonsmokers from all causes,
ln = logarithm to base e, and log = logarithm to base 10.

This formulation reduces to formula (2) in the case where q_s refers to death from all causes. When the death rates are small, q_s is given with close approximation by the absolute difference $(Q_s - Q'_n)$.

In table 2, the hypothetical effect of heavy smoking as measured by the absolute difference of the respective rates, and by the absolute difference corrected, is shown for each of the categories of death concerned. It is to be noted that the corrections leave the absolute differences practically unaffected. We see that, as judged by the corrected as well as by the uncorrected differences, the putative effect of heavy smoking relates to each of the categories of cause of death, and affects coronary thrombosis more than it affects lung cancer. This is in contrast to the impression conveyed by the "mortality ratio," also shown in the table, which leaves the impression that, overwhelmingly, there is a specific effect on lung cancer. The mortality ratio has frequently been used to measure the supposed effect of smoking on death rates. It is notable that Dr. Sheps repudiates the use of this index, even as I had repudiated it in a previous publication.[30] The point seems to merit consideration in somewhat greater detail.

Table 2
Comparison of Heavy Smokers and Nonsmokers (Data of Doll and Hill[21])
Absolute Differences and Mortality Ratios

Cause of death	Death rate among heavy smokers, Q_s probability	Death rate among nonsmokers, Q'_n probability	Absolute difference per 100,000		Mortality ratio,* Q_s/Q'_n
			Uncorrected	Corrected	
All causes	.01884	.01325	559	567	1.4
Cancer of the lung	.00166	.00007	159	160	23.7
Other cancer	.00263	.00204	59	60	1.3
Other respiratory disease	.00141	.00081	60	61	1.7
Coronary thrombosis	.00599	.00422	177	180	1.4
Other causes	.00719	.00611	108	111	1.2

*Various indices and terms for them are employed for what, in respect to the present discussion, may be regarded as equivalent to the tabled quantity. The "standardized mortality ratio" (S.M.R.) refers to the ratio of death rates adjusted to some standard age distribution. The "ratio of observed to expected deaths" is essentially an S.M.R. in which the age distribution of the population of smokers is used as standard.

The prospective studies have been considered as an analysis of experiments performed by nature. One group of persons has smoked, another has not. The first is the experimental group, the second is the control. The experiments would better be done on animals. Suppose we do some!

*See Note 2, following.

*This is not to say that such ratios cannot have operational meaning in some other model than one which assumes that the differences in the observed rates are due to causation or active increase of deaths by smoking. For instance, in a model I[2] presented which explains the observed differences, hypothetically, on the basis of a bias arising from "selective association," the selective effect would be measured in terms of such ratios, for which the formulas are given by Brownlee.[9]

1. We expose a large group N of animals to benzpyrene, a substance suspected of killing animals by causing lung cancer. A group N′ is used as controls. We observe $D_1>0$ deaths from lung cancer among the N exposed, and $D'_1 = 0$ such deaths among the N′ controls. We compute

$q_1 = D_1/N>0$

$q'_1 = D'_1/N' = 0$

As a conclusion of this experiment, we will say that benzpyrene is a mortal toxin. It kills animals by causing lung cancer, and its effectiveness is measured by

$q_1 - q'_1 = q_1$

We will not say that its effectiveness is measured by the mortality ratio

$q_1/q'_1 = \infty$

We suspect that another substance X_x is deadly, killing animals by causing diseases other than lung cancer. We perform an experiment as before, but now with the substance X. We observe $D_\circ>0$ deaths from diseases other than lung cancer among the N exposed, and $D'_\circ = 0$ such deaths among the N′ controls. We compute

$q_\circ = D_\circ/N>0$

$q'_\circ = D'_\circ/N' = 0$

We will conclude that substance X is deadly, killing animals by causing diseases other than lung cancer, and that its potency is measured by $q_\circ$. If $q_\circ>q_1$ we will say that the substance X is more effective than benzpyrene. *We will not say that they are equally potent because their mortality ratios are equal*, that is,

$q_1/q'_1 = q_\circ/q'_\circ = \infty$

2. Now suppose that we cannot have benzpyrene separately from substance X, because they are available only in a mixture of the two. We perform an experiment as above, but now with the mixture. We observe $D_1>0$, $D_\circ>0$ among the N animals exposed, $D'_1 = 0$, $D'_\circ = 0$ among the N′ controls. We compute the crude rates

$Q_1 = D_1/N>0$

$Q_\circ = D_\circ/N>0$

$Q'_1 = D'_1/N' = 0$

$Q'_\circ = D'_\circ/N' = 0$

If we measure the potency of benzpyrene and substance X respectively by Q_1 and $Q_\circ$, we will be in error. These are the crude rates, and they are affected by the competition of the net risks q_1, $q_\circ$. To estimate q_1, $q_\circ$ from Q_1, $Q_\circ$ we must make an assumption about the time relation of the force of mortality (instantaneous risk) for the net risks. If, with the q's acting alone (net risks), the instantaneous risk, β, for each risk is considered constant over the time period during which the population is observed (a year, say), and they act independently, even in the mixture, then the following are the relationships among the relevant quantities:

$$q_1 = 1 - e^{-\beta_1} \tag{6}$$

$$q_\circ = 1 - e^{-\beta_\circ} \tag{7}$$

$$\beta_1 = -\frac{Q_1}{Q_t} \ln (1 - Q_t) \tag{8}$$

$$\beta_\circ = -\frac{Q_\circ}{Q_t} \ln (1 - Q_t) \tag{9}$$

$$Q_1 = \frac{\beta_1}{\beta_1 + \beta_\circ} Q_t \tag{10}$$

$$Q_\circ = \frac{\beta_\circ}{\beta_1 + \beta_\circ} Q_t \tag{11}$$

where the total death rate (all causes) is $Q_t = Q_1 + Q_\circ$. For small values of q_1, $q_\circ$ these are given with good approximation by,

$$q_1 \doteqdot Q_1 \tag{12}$$

$$q_\circ \doteqdot Q_\circ \tag{13}$$

†Substance X can be considered to represent the combined effect of many factors.

If $q_\circ>q_1$ we will say that substance X is more effective than benzpyrene. *We will not say that they are equally potent because their mortality ratios are equal*, that is,

$Q_1/Q'_1 = Q_\circ/Q'_\circ = \infty$

3. Now suppose the animals in question are subject to a natural mortality from lung cancer and also from diseases other than lung cancer, and that such deaths, when they occur, are indistinguishable from those due to benzpyrene and substance X. We will assume that for each cause of death, if it were the only existing cause of death, the instantaneous risk is constant over the observation period, and will represent the constant value by β. Then the net risks, that is, the probabilities of death in the unit period, if each cause were acting alone, are:

$$q_1 = 1 - e^{-\beta_1} \tag{14}$$

$$q_\circ = 1 - e^{-\beta_\circ} \tag{15}$$

$$q'_1 = 1 - e^{-\beta'_1} \tag{16}$$

$$q'_\circ = 1 - e^{-\beta'_\circ} \tag{17}$$

where

q_1 is the death rate from lung cancer caused by benzpyrene,

$q_\circ$ is the death rate from other diseases caused by substance X,

q'_1 is the death rate from lung cancer resulting from natural causes, and

$q'_\circ$ is the death rate from other diseases resulting from natural causes.

We will observe as the corresponding crude risks among the controls

$$Q'_1 = \frac{\beta'_1}{\beta'_1 + \beta'_\circ} Q'_t \tag{18}$$

$$Q'_\circ = \frac{\beta'_\circ}{\beta'_1 + \beta'_\circ} Q'_t \tag{19}$$

where the total death rate is $Q'_t = Q'_1 + Q'_\circ$
and in the experimental group

$$Q_1 = \frac{\beta_1 + \beta'_1}{\Sigma\beta} Q_t \tag{20}$$

$$Q_\circ = \frac{\beta_\circ + \beta'_\circ}{\Sigma\beta} Q_t \tag{21}$$

where $\Sigma\beta = \beta_1 + \beta'_1 + \beta_\circ + \beta'_\circ$ (22)
and the total death rate is $Q_t = Q_1 + Q_\circ$.
The formulas for recovering q_1 and $q_\circ$ from the observed rates Q_1, $Q_\circ$, Q'_1, $Q'_\circ$ are

$$\log (1 - q_1) = \frac{Q_1}{Q_t} \log (1 - Q_t) - \frac{Q'_1}{Q'_t} \log (1 - Q'_t) \tag{23}$$

$$\log (1 - q_\circ) = \frac{Q_\circ}{Q_t} \log (1 - Q_t) - \frac{Q'_\circ}{Q'_t} \log (1 - Q'_t) \tag{24}$$

For small values of q_1 and $q_\circ$, these are given with good approximation by the differences

$q_1 \doteqdot Q_1 - Q'_1$

$q_\circ \doteqdot Q_\circ - Q'_\circ$

If $q_\circ>q_1$ it means that the substance X, in its action of producing deaths from diseases other than lung cancer, is more effective than benzpyrene in causing deaths with lung cancer. If one used the mortality ratios $Q_\circ/Q'_\circ$ and Q_1/Q'_1 to measure the effects of substance X and benzpyrene respectively and if it happened that $q'_\circ$ was much larger than q'_1, then even if $q_\circ$ was much larger than q_1, it might appear that substance X is little if at all effective, while benzpyrene is very effective.

This is about what has happened in the discussion of smoking as a cause of lung cancer. Since the natural mortality of lung cancer is relatively low, the use of the mortality ratio, that is, the ratio of the death rate of smokers to

the death rate of nonsmokers, has made it appear that the effect of smoking on the death rate from lung cancer is exceedingly great. For diseases other than lung cancer, for which the natural death rate is much larger and the mortality ratio therefore not so large, the effect of smoking on death rate has appeared much smaller. If a correct measure of the effect of smoking in increasing death rate is used, supposing this to be the explanation of the larger recorded death rate for the smokers, the reverse comparison results.

NOTE 2

Sheps' Argument*

Suppose it has been suggested that a certain drug is mortally toxic for some specified animals. The drug's action is not necessarily immediate; it may take time for its effect to be exhibited in the death of the animal. It is decided to test the drug by administering it to a large sample of animals, and then to observe them for a year.

One hundred thousand animals are used for the experiment. It is known that their natural mortality is 10 per cent per annum, so if the drug is not administered, 10,000 of the animals will die in a year. The drug is administered to each animal and the colony is observed for one year. It is found that 15,000 animals have died.

That the experimenter should conclude that 5000 animals have been killed by the drug seems unquestionable. There are some certain (unidentifiable) animals, numbering 5000, who would have been alive at the end of the year, had the drug not been administered to them. How shall we express the mortal effectiveness of the drug?

We will not say "The drug kills 5000 animals." We will realize that had the drug been administered to 200,000 instead of 100,000 animals, 30,000 would have been found dead, and we should have concluded that the drug had killed 10,000 of these. Perhaps we will say "The drug kills 5 per cent of the animals to which it is administered (5000/100,000)." In a sense that should be clear from the description of the experiment, this statement would be correct.

But Sheps says this is not a sound measure of the killing power of the drug. Since 10,000 of the animals would die in the year even if the drug were not administered, effectively only 90,000 animals were "exposed to the risk" of being killed by the drug. One should divide 5000, which is the number killed by the drug, by 90,000, and conclude that 5.56 per cent measures the killing power of the drug, not 5.00 per cent.

Although, considered as a precise analysis of the problem, this presentation is doubtless an oversimplification, I agree that it is essentially correct. But whether we should divide the 5000 by 100,000 or by 90,000 is not the important question here — it does not make an enormous difference. The important question is "By what rationale does one conclude that one should divide 5000 by 10,000 (mortality ratio) to measure the lethal effectiveness of the drug?" As suggested by Sheps, smoking possibly can be fatal to the living, but not to the dead. This is the question which those writers should answer who maintain that mortality ratios, computed from data of the prospective studies, are proper measures of the supposed mortal effects of smoking.

NOTE 3

Mortality Ratio

The mortality ratios are inappropriate indices of the effect of smoking, if the higher death rates among smokers are considered to reflect an actual causal effect of smoking in increasing the probability of death. But the ratios may be quite appropriate for consideration on some other hypothesis of the origin of the recorded higher death rates. If we accept the idea that the higher general death rates among smokers has a basis in a different physical constitution of persons who smoke and those who do not smoke, then a bias in diagnosis would result in high ratios for diseases believed to be related to smoking. For instance, Wynder[41] has noted that physicians use the smoking history of patients as an aid in differential diagnosis of lung conditions. Therefore in doubtful cases, if the patient is a smoker, the physician will be inclined to make the diagnosis of lung cancer, just as in other doubtful cases, if the patient is an imbiber of alcoholic beverages, the physician will be inclined to make a diagnosis of alcoholic cirrhosis of the liver. This is logical, if the phyician believes that smoking or use of alcohol is related to the development of the disease in question (likelihood principle). If there is a larger general death rate among smokers, the tendency of physicians to diagnose conditions which they think are caused or aggravated by smoking would result in a relatively greater proportion of such diagnoses among smokers. This sort of bias would tend to increase the number of such diagnoses in proportion to their natural frequency, since its effect would be in direct relation to the frequency with which such cases arise as diagnostic problems. On the basis of such an hypothesis, therefore, one would expect the mortality ratios to be higher with those diseases which physicians think are related to smoking. This would explain the paradox that the ratios are not in order with the absolute differences, as one would expect them to be if both reflected a causal or aggravating effect of smoking on these diseases. It would also explain the paradox of the failure to produce bronchogenic lung cancer in animals experimentally by subjecting them to heavy smoking, in contrast with the ready ease with which apparent evidence that smoking causes lung cancer in man can be found statistically. Scientists generally have been impressed by this paradox, and it was commented on by the English publication Nature:[36] "The present position would seem to be summed up in a most interesting paradox: Statistically, the case against cigarettes grows more and more convincing at the same time as, experimentally . . . it seems to grow thinner and thinner." This opinion, expressed late in 1956, seems equally valid at the time of the present writing (1959).

*As interpreted by the present writer.

REFERENCES

1. Berkson, Joseph: The Calculation of Survival Rates. In Walters, Waltman, Gray, H. K. and Priestley, J. T. (Ed.): Carcinoma and Other Malignant Lesions of the Stomach. Philadelphia, W. B. Saunders Company, 1942, pp. 467-484.
2. Berkson, Joseph: The Statistical Study of Association Between Smoking and Lung Cancer. Proc. Staff Meet., Mayo Clin. 30:319-348 (July 27) 1955.
3. Berkson, Joseph: Smoking and Lung Cancer: Some Observations on Two Recent Reports. J. Am. Statist. A. 53:28-38 (Mar.) 1958.
4. Berkson, Joseph: The Statistical Investigation of Smoking and Lung Cancer. J. de Pharmacie de Belgique. (In press.)
5. Berkson, Joseph and Gage, R. P.: Calculation of Survival Rates for Cancer. Proc. Staff Meet., Mayo Clin. 25:270-286 (May 24) 1950.
6. Berkson, Joseph, Harrington, S. W., Clagett, O. T., Kirklin, J. W.Dockery, M. B. and McDonald, J. R.: Mortality and Survival in Surgically Treated Cancer of the Breast: A Statistical Summary of Some Experience of the Mayo Clinic. Proc. Staff Meet., Mayo Clin. 32:645-670 (Nov. 13) 1957.
7. Birkhoff, G. D.: Newton's Philosophy of Gravitation With Special Reference to Modern Relativity Ideas. In: Sir Isaac Newton, 1727-1927: A Bicentenary Evaluation of His Work. Baltimore, Williams & Wilkins Company, 1928, pp. 51-64.
8. Bock, F. G.: Roswell Park Memorial Institute, Buffalo, New York, Preliminary Results. (Unpublished data.)
9. Brownlee, K. A.: A Note on the Effects of Nonresponse on Surveys. J. Am. Statist. A. 52:29-32 (Mar.) 1957.
10. Doll, Richard and Hill, A. B.: The Mortality of Doctors in Relation to Their Smoking Habits. Brit. M. J. 1:1451-1455 (June 26) 1954.
11. Doll, Richard and Hill, A. B.: Lung Cancer and Other Causes of Death in Relation to Smoking: A Second Report on the Mortality of British Doctors. Brit. M. J. 2:1071-1081 (Nov. 10) 1956.
12. Doll, R., Hill, A. B. and Kreyberg, L.: The Significance of Cell Type in Relation to the Aetiology of Lung Cancer. Brit. J. Cancer 11:43-48 (Mar.) 1957.
13. Dorn, H.: Tobacco Consumption and Mortality From Cancer and Other Diseases. Presented at the 7th International Cancer Congress in London, July 8, 1958.
14. Finney, D. J.: Probit Analysis: A Statistical Treatment of the Sigmoid Response Curve. Cambridge, Cambridge University Press, 1947, 256 pp.

15. Fisher, R. A.: Lung Cancer and Cigarettes? Nature 182:108 (July 12) 1958.
16. Fisher, R. A.: Cancer and Smoking. Nature 182:596 (Aug. 30) 1958.
17. Greenwood, M., Hill, A. B., Topley, W. W. C. and Wilson, J.: Experimental Epidemiology. M. Res. Council, Special Report Series. 209:7-204, 1936.
18. Greville, T. N. E.: Mortality Tables Analyzed by Cause of Death. The Record, Am. Inst. Actuaries 37:283-294, 1948.
19. Hammond, E. C. and Horn, Daniel: The Relationship Between Human Smoking Habits and Death Rates: A Follow-up Study of 187,766 Men. J.A.M.A. 155:1316-1328 (Aug. 7) 1954.
20. Hammond, E. C. and Horn, Daniel: Smoking and Death Rates Report on Forty-four Months of Follow-up of 187,783 Men. I. Total Mortality. J.A.M.A. 166:1159-1172 (Mar. 8) 1958.
21. Hammond, E. C. and Horn, Daniel: Smoking and Death Rates — Report on Forty-four Months of Follow-up of 187,783 Men. II. Death Rates by Cause. J.A.M.A. 166:1294-1308 (Mar. 15) 1958.
22. Heath, C. W.: Differences Between Smokers and Nonsmokers. A.M.A. Arch. Int. Med. 101:377-388 (Feb.) 1958.
23. Hill, A. B.: Statistics in Medical Research. Triangle 2:208-215 (July) 1956.
23a. Irwin, J. O.: Experiments on the Carcinogenic Action of Mineral Oils. Bull. Inst. Internat. Statstique 36(pt. 3):184-192, 1958.
24. Korteweg, R.: The Significance of Selection in Prospective Investigations Into an Association Between Smoking and Lung Cancer, Brit. J. Cancer 10:282-291 (June) 1956.
25. Leuchtenberger, C., Leuchtenberger, R., Zebrun, W. and Shaffer, P.: A Correlated Histological, Cytological, and Cytochemical Study of the Sequence of Events in the Bronchial Epithelium From Mice Exposed to Cigarette Smoke. Presented at the 7th International Cancer Congress in London, July 7, 1958.
26. Lilienfeld, A. M.: Emotional and Other Selected Characteristics of Cigarette Smokers and Nonsmokers as Related to Epidemiological Studies of Lung Cancer and Other Diseases. J. Nat. Cancer Inst. 22:259-282 (Feb.) 1959.
27. Lorenz, Egon, Stewart, H. L., Daniel, J. H. and Nelson, C. V.: The Effects of Breathing Tobacco Smoke on Strain A Mice. Cancer Res. 3:123 (Feb.) 1943.
28. McWhirter, R.: Simple Mastectomy and Radiotherapy in the Treatment of Breast Cancer. Brit. J. Radiol. 28:128-139 (Mar.) 1955.
29. Medical Research Council. Report for the Years 1948-1950. (July) 1951, pp. 27-29.
20. Medical Research Council. Report for the Year 1955-56. (May) 1957, pp. 10-15.
31. Merz, J. T.: A History of European Thought in the Nineteenth Century. Edinburgh, William Blackwood and Sons, 1923, p. 284.
32. Neyman, Jerzy: First Course in Probability and Statistics. New York, Henry Holt and Company, 1950, pp. 69-95.
33. Passey, R. D.: Carcinogenicity of Cigarette Tars. Brit. Empire Cancer Campaign, Part II, 1957, pp. 65-66.
34. Pearl, Raymond: The Rate of Living Being an Account of Some Experimental studies on the Biology of Life Duration. New York, A. A. Knopf, 1928, 185 pp.
35. Pearl, Raymond: Introduction to Medical Biometry and Statistics. Philadelphia, W. B. Saunders Company, 1940, pp. 1-19.
36. Progress of Cancer Research. Nature 178:667-670 (Sept. 29) 1956.
37. Sheps, M. C.: Shall We Count the Living or the Dead? New England J. Med. 259:1210-1214 (Dec. 18) 1958.
38. Smoking and Health: Joint Report of the Study Group on Smoking and Health. Science 125:1129-1133 (June 7) 1957.
39. Thomas, Caroline B.: Familial and Epidemiologic Aspects of Coronary Disease and Hypertension. J. Chronic Dis. 7:198-208 (Mar.) 1958.
40. Wells, H. G.: Relation of Clinical to Necropsy Diagnosis in Cancer and Value of Existing Cancer Statistics. J.A.M.A. 80:737-740 (Mar. 17) 1923.
41. Wynder, E. L. (Ed.): Neoplastic Diseases. In: The Biologic Effects of Tobacco: With Emphasis on the Clinical and Experimental Aspects. Boston, Little, Brown and Company, 1955, pp. 102-132.

she calls it "nervous indigestion"

diagnosis: a wrought-up patient with a functional gastro-intestinal disorder compounded by inadequate digestion. **treatment:** reassurance first, then medication to relieve the gastric symptoms, calm the emotions, and enhance the digestive process. **prescription:** new Donnazyme—providing the multiple actions of widely accepted Donnatal® and Entozyme®—two tablets t.i.d., or as necessary.

Each Donnazyme tablet contains
—In the gastric-soluble outer layer: Hyoscyamine sulfate, 0.0518 mg.; Atropine sulfate, 0.0097 mg.; Hyoscine hydrobromide, 0.0033 mg.; Phenobarbital (1/8 gr.), 8.1 mg.; and Pepsin, N. F., 150 mg. **In the enteric-coated core:** Pancreatin, N. F., 300 mg., and Bile salts, 150 mg.

ANTISPASMODIC - SEDATIVE - DIGESTANT

DONNAZYME®

A. H. ROBINS COMPANY, INCORPORATED • RICHMOND 20, VIRGINIA

SPEED

DURATION

IN *ORAL* CONTROL OF PAIN

ACTS FASTER—usually within 5-15 minutes. **LASTS LONGER**—usually 6 hours or more. **MORE THOROUGH RELIEF**—permits uninterrupted sleep through the night. **RARELY CONSTIPATES**—excellent for chronic or bedridden patients.

AVERAGE ADULT DOSE: 1 tablet every 6 hours. May be habit-forming. Federal law permits oral prescription.

Each PERCODAN® Tablet contains 4.50 mg. dihydrohydroxycodeinone hydrochloride, 0.38 mg. dihydrohydroxycodeinone terephthalate, 0.38 mg. homatropine terephthalate, 224 mg. acetylsalicylic acid, 160 mg. phenacetin, and 32 mg. caffeine.

Also available — for greater flexibility in dosage — PERCODAN®-DEMI: The PERCODAN formula with one-half the amount of salts of dihydrohydroxycodeinone and homatropine.

Endo®

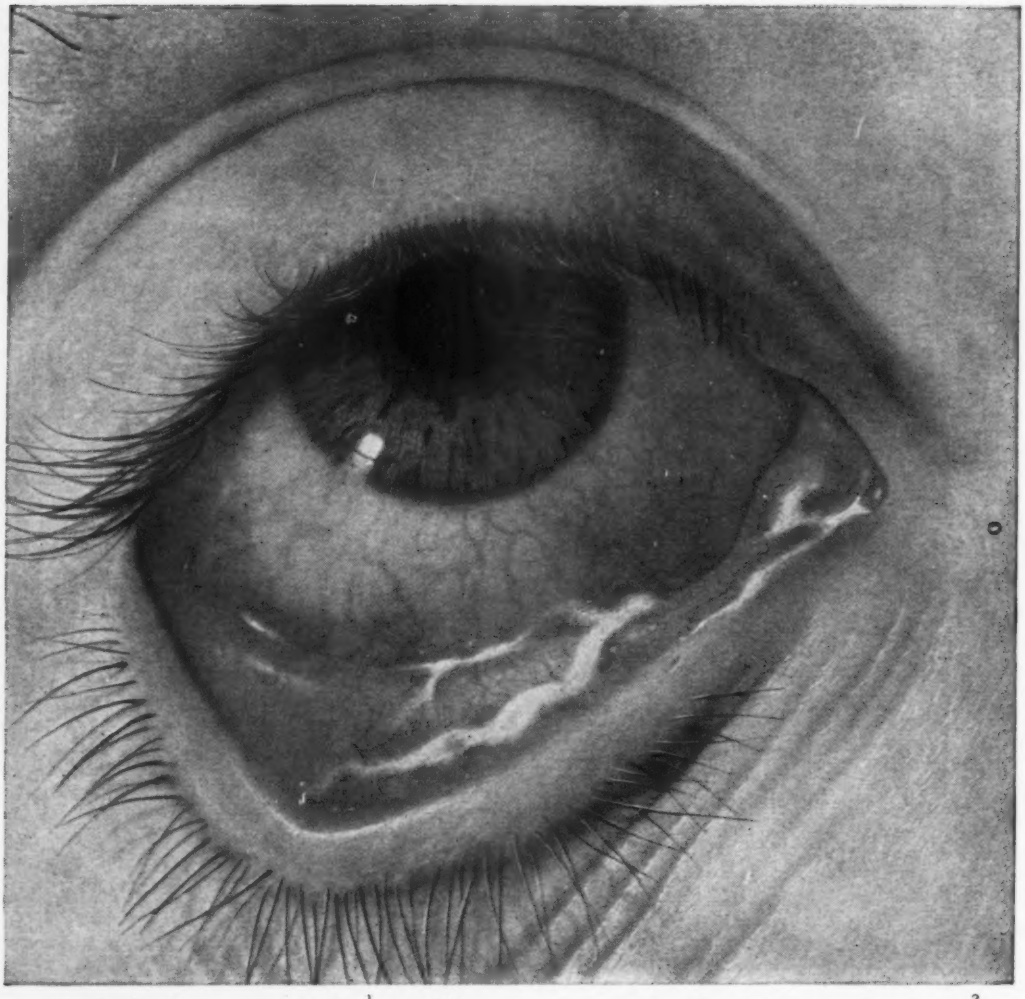
Literature? Write
ENDO LABORATORIES
Richmond Hill 18, New York

Percodan® *Tablets*

Salts of Dihydrohydroxycodeinone and Homatropine, plus APC

FOR PAIN

U.S. Pat. 2,628,185



no irritating crystals[1] · uniform concentration in each drop[2]

STERILE OPHTHALMIC SOLUTION

NEO-HYDELTRASOL®

PREDNISOLONE 21-PHOSPHATE-NEOMYCIN SULFATE

2,000 TIMES MORE SOLUBLE THAN PREDNISOLONE OR HYDROCORTISONE

"The solution of prednisolone has the advantage over the suspension in that no crystalline residue is left in the patient's cul-de-sac or in his lashes . . . . The other advantage is that the patient does not have to shake the drops and is therefore sure of receiving a consistent dosage in each drop."[2]

1. Lippmann, O.: Arch. Ophth. **57**:339, March 1957.
2. Gordon, D.M.: Am. J. Ophth. **46**:740, November 1958.

supplied: 0.5% Sterile Ophthalmic Solution NEO-HYDELTRASOL (with neomycin sulfate) and 0.5% Sterile Ophthalmic Solution HYDELTRASOL®. In 5 cc. and 2.5 cc dropper vials. Also available as 0.25% Ophthalmic Ointment NEO-HYDELTRASOL (with neomycin sulfate) and 0.25% Ophthalmic Ointment HYDELTRASOL. In 3.5 Gm. tubes.

HYDELTRASOL and NEO-HYDELTRASOL are trademarks of Merck & Co., Inc.

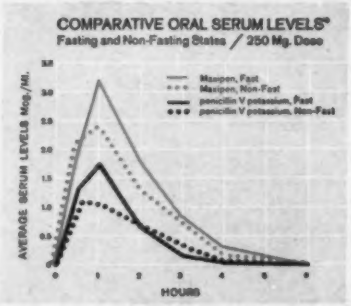
MSD MERCK SHARP & DOHME Division of Merck & Co., Inc., Philadelphia 1, Pa.

Maximal Absorption
Acid stable, highly soluble

Maximal Blood Levels

Maximal Flexibility
May be administered without regard to meals. However, highest absorption is achieved when taken just before or between meals.

Maximal Oral Indications
Indicated in infections caused by streptococci, pneumococci, susceptible staphylococci, and gonococci



*Based on 3294 individual serum antibiotic determinations. Complete details available on request.

DOSAGE: For moderately severe conditions, 125 to 250 mg. three times daily. For more severe conditions, 500 mg. as often as every four hours around the clock.

NOTE: To date, MAXIPEN has not shown less allergic reactions than older oral penicillins. Usual precautions regarding penicillin administration should be observed.

SUPPLIED: MAXIPEN TABLETS, scored, 125 mg. (200,000 units), bottles of 36; 250 mg. (400,000 units), bottles of 24 and 100 tablets. MAXIPEN FOR ORAL SOLUTION, reconstituted each 5 cc. contains 125 mg. (200,000 units), in 60 cc. bottles.

MAXIPEN, the orally maximal penicillin, is a triumph of man over molecule; a product of Pfizer Research

ROERIG Rx

New York 17, N. Y.
Division, Chas. Pfizer & Co., Inc.
Science for the World's Well-Being

Future Medical Meetings and Postgraduate Education

ARIZONA HEART ASSOCIATION

The Annual Meeting of the Arizona Heart Association will be held on Saturday, May 21, at the Valley Ho in Scottsdale. All physicians are cordially invited to attend the sessions that will begin at 2:30 P.M.

OGDEN SURGICAL SOCIETY

The Fifteenth Annual Meeting of the Ogden Surgical Society is scheduled for May 18, 19 and 20, 1960, Ogden, Utah. The scientific meetings will be held in the Orpheum Theatre, 2520 Washington Boulevard. The following doctors have been obtained as guest speakers:

Joel Wilson Baker
William H. Beierwaltes
John Caffey
Clarence Crafoord
Heinz F. Eichenwald
Frank H. Gardner
Leonard J. Goldwater
Edward H. Hashinger
C. Paul Hodgkinson
Irwin H. Kaiser
A. Edward Maumenee
Alton Ochsner
Alton Ochsner, Jr.
William H. ReMine
Jonathan E. Rhoads

THE 109TH ANNUAL A.M.A. MEETING

The 109th annual meeting of the American Medical Association will be a forum presented by some of the nation's top medical men.

Approximately 2,000 physicians, all outstanding in their field, will participate in presenting the scientific program of the meeting to be held in Miami Beach, June 13-17.

ART WORKS EXHIBITION

The 23rd annual exhibition of art works by American physicians will be held June 13 through June 18, 1960, at the Miami Beach Exhibition Hall and Auditorium.

Held in conjunction with the annual convention of the American Medical Association, the show will include over 300 works of art in oil, water color, sculpture, crafts, photography and lithography.

Participants and prospective exhibitors may obtain further information from Dr. Kurt F. Falkson, 7 East 78th Street, New York City, Secretary of the American Physicians Art Association.

POST GRADUATE SEMINAR

Post-graduate Seminar in Arthritis and Related Diseases will be held June 11-12, 1960 in the Diplomat Hotel, Hollywood-By-The-Sea, Florida, immediately following the Annual Meeting of the American Rheumatism Association, and immediately preceding the Annual Meeting of the American Medical Association. This course is acceptable for 8 hours Category I credit by the Academy of General Practice.

PG ASSEMBLY OF SOUTH TEXAS

Shamrock Hilton, Houston

July 18, 19, 20, 1960

Medical Discussions in Depth . . .

"Symposia followed by Panel Discussions"

4 Major Sections

Medicine, Surgery, Obstetrics & Gynecology,

Opthalmology & Otolaryngology

CALENDAR OF NATIONAL AND INTERNATIONAL MEETINGS

May, 1960		
9-13	American College of Physicians Postgraduate Course No. 4 "Early Detection and Prevention of Disease"	Philadelphia, Pa.
11-13	American Association of Genito-Urinary Surgeons	Dearborn Inn Dearborn, Mich.
11-13	American Association for Thoracic Surgery	Deauville Hotel Miami Beach, Fla.
15-18	International College of Surgeons, International Congress	Rome, Italy
15-20	National Tuberculosis Association The American Trudeau Society National Conference of Tuberculosis Workers	Statler-Hilton and Biltmore Hotels Los Angeles, Calif.
16-20	American College of Physicians Postgraduate Course No. 5 "Current Research in Cardiovascular Disease"	National Heart Inst. Bethesda, Maryland
23-26	American College of Physicians Postgraduate Course No. 6 "The Hypertensive Diseases"	Boston, Mass.
June, 1960		
3	ACS Board of Directors Meeting	Los Angeles, Calif.
5-10	National Conference on Social Welfare	Atlantic City, N. J.
6-24	Trudeau School of Tuberculosis and Other Pulmonary Diseases – Forty-fifth Session	Saranac Lake, N. Y.
8-12	American College of Chest Physicians	Miami Beach, Fla.
13-17	American Medical Association – Annual Meeting	Miami Beach, Fla.
13-17	Canadian Medical Association International Congress of Clinical Pathology	Banff, Alberta Madrid, Spain
20-24	American College of Physicians Postgraduate Course No. 7 – "Internal Medicine"	Indianapolis, Ind.
July, 1960		
18-23	International Congress of Endocrinology	Copenhagen, Denmark
20	ACS Research Committee	New York City
20-21	Rocky Mountain Cancer Conference	Denver Hilton Hotel Denver, Colo.
Aug., 1960		
2-5	International Association of Laryngectomees – Annual Convention	Chase Hotel St. Louis, Mo.
8-11	National Medical Association, Inc.	Penn-Sheraton Hotel Pittsburgh, Pa.
21-26	Third International Congress of Physical Medicine	The Mayflower Hotel Washington, D. C.
24-27	International Congress of Internal Medicine (Sixth)	Basel, Switzerland
27-9/1	American Hospital Association	Civic Auditorium San Fanrcisco, Calif.
28-9/1	International Congress on Diseases of the Chest	Vienna, Austria
Sept., 1960		
11-15	International College of Surgeons Twelfth International Congress	New York City
13-15	Fourth National Cancer Conference	Minneapolis, Minn.
22-26	International Cancer Cytology Conference	Madrid, Spain
25-30	College of American Pathologists	Chicago, Ill.
27-10/5	Pan-Pacific Surgical Association – Eighth Congress	Honolulu, Hawaii

Oct., 1960		
10-14	American College of Surgeons 46th Annual Clinical Congress	San Francisco, Calif.
Nov., 1960		
19-21	International Symposium on Fibrinolysis	Aspen, Colo.

REGIONAL SPRING AND SUMMER MEETINGS

May, 1960		
12-14	Nevada Academy of General Practice	Reno, Nevada
16-18	American Ophthalmological Society	Colorado Springs, Colo.
18-21	American Academy of General Practice New Mexico Chapter	Rudioso, New Mexico
June, 1960		
1-3	Physical Medicine and Rehabilitation in Neuromuscular and Medical Conditions University of Colorado Medical Center	Denver, Colorado
17-19	Conference on Research in Emphysema	Aspen, Colorado
20-25	Clinical Hematology (limited to 12 registrants) University of Colorado Medical Center	Denver, Colorado
22-25	Society of Nuclear Medicine	Estes Park, Colorado
27-29	Obstetrics and Gynecology University of Colorado Medical Center	Denver, Colorado
July, 1960		
5-8	Ophthalmology	Aspen, Colorado
18-21	New Mexico Chapter, American Academy of General Practice, Ruidoso Summer Clinic	Rudioso, New Mexico
20-21	Rocky Mountain Cancer Conference	Denver, Colorado
21-23	Dermatology for General Practitioners University of Colorado Medical Center	Denver, Colorado
27-29	American Academy of Pediatrics, Regional Meeting	Denver, Colorado
Aug., 1960		
10-13	Rocky Mountain Radiological Society	Denver, Colorado
11-13	Medical Statistics for the Clinician "What Numbers Can You Believe?" University of Colorado Medical Center	Denver, Colorado
15-19	Western Cardiac Conference	Denver, Colorado
31-9/6	Pediatrics	Estes Park, Colorado

UNIVERSITY OF CALIFORNIA POSTGRADUATE PROGRAMS

SPRING AND SUMMER, 1960

June 24-17 – SURGICAL ANATOMY
June 24 – Head and Neck
June 25 & 26 – Thorax, Abdomen and Pelvis
June 27 – Extremities
July 17-20 – GENERAL PEDIATRICS
University Conference Center
Lake Arrowhead
July 20-24 – ADVANCED SEMINARS IN INTERNAL MEDICINE
University Conference Center
Lake Arrowhead
July 25 & 26 – DERMATOLOGY IN OFFICE PRACTICE
July 27-31 – ADVANCED SEMINARS IN DERMATOLOGY
University Conference Center
Lake Arrowhead
August 3-5 – ANESTHESIA FOR SPECIAL PROCEDURES
August 17 & 18 – ARTHRITIS AND RHEUMATISM
August 26 & 27 – OBSTETRICAL PROCEUDRES, COMPLICATIONS AND ADVANCES

for the tense and nervous patient

relief comes fast and comfortably

– does not produce autonomic side reactions

– does not impair mental efficiency, motor control, or normal behavior

– has not produced hypotension, Parkinson-like symptoms, agranulocytosis or jaundice

Usual Dosage: One or two 400 mg. tablets t.i.d.

Supplied: 400 mg. scored tablets, 200 mg. sugar-coated tablets or as MEPROTABS*—400 mg. *unmarked*, coated tablets.

Miltown®

meprobamate (Wallace)

*TRADE-MARK

WALLACE LABORATORIES / *New Brunswick, N. J.*

CM-111B

in the low back syndrome

relieves both stiffness and pain with safety... sustained effect

In 100 consecutive patients with the low back syndrome, Kestler[1] reported that particularly gratifying was the ability of SOMA "to relax muscular spasm, relieve pain, and restore normal movement, thus speeding recovery in a large majority of the patients."

RESULTS WITH SOMA IN THE LOW BACK SYNDROME*

*Investigators' reports to the Medical Department, Wallace Laboratories. (Total of 278 cases)

NOTABLE SAFETY—extremely low toxicity; no known contraindications; side effects are rare; drowsiness may occur, usually at higher dosage

RAPID ACTION—starts to act quickly **SUSTAINED EFFECT**—relief lasts up to 6 hours

EASY TO USE—usual adult dosage is one 350 mg. tablet 3 times daily and at bedtime

SUPPLIED—as white, coated, 350 mg. tablets, bottles of 50; also available for pediatric use: 250 mg., orange capsules, bottles of 50

1. Kestler, O.: In The Pharmacology and Clinical Usefulness of Carisoprodol, Wayne State University Press, Detroit, 1959. 2. Berger, F. M.; Kletzkin, M.; Ludwig, B. J.; Margolin, S., and Powell, L. S.: J. Pharm. Exp. Ther. *127*:66 (Sept.) 1959. 3. Spears, C. E. and Phelps, W. M.: Arch. Pediat. *76*:287 (July) 1959. 4. Phelps, W. M.: Arch. Pediat. *76*:243 (June) 1959. 5. Friedman, A. P.; Frankel, K., and Fransway, R. L.: Papers presented at Scientific Meeting, New York State Society of Industrial Medicine, Inc., New York, Sept. 30, 1959. 6. Kuge, T.: Unpublished reports. 7. Ostrowski, J. P.: Orthopedics *2*:7 (Jan.) 1960.

Literature and samples on request

Also available on request: The Pharmacology and Clinical Usefulness of Carisoprodol, Wayne State University Press, Detroit, 1959. (185 pages)

SOMA™

(carisoprodol Wallace)

WALLACE LABORATORIES, New Brunswick, New Jersey

Incremin®

Lysine-Vitamins Lederle

with iron Syrup

for the undersized underweight child

build appetite

with
B complex
vitamins

prevent nutritional anemia

with ferric pyrophosphate, a form of iron exceptionally well-tolerated

in taste-tempting cherry flavor

Average dosage, 1 teaspoonful (5 cc.) contains:

l-Lysine HCl	300 mg.
Vitamin B_{12} Crystalline	25 mcgm.
Thiamine HCl (B_1)	10 mg.
Pyridoxine HCl (B_6)	5 mg.
Ferric Pyrophosphate (Soluble)	250 mg.
Iron (as Ferric Pyrophosphate)	30 mg.
Sorbitol	3.5 Gm.
Alcohol	.75%

Bottles of 4 and 16 fl. oz.

promote protein uptake

with the potentiating effect of l-Lysine on low-grade protein foods

Lederle LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York

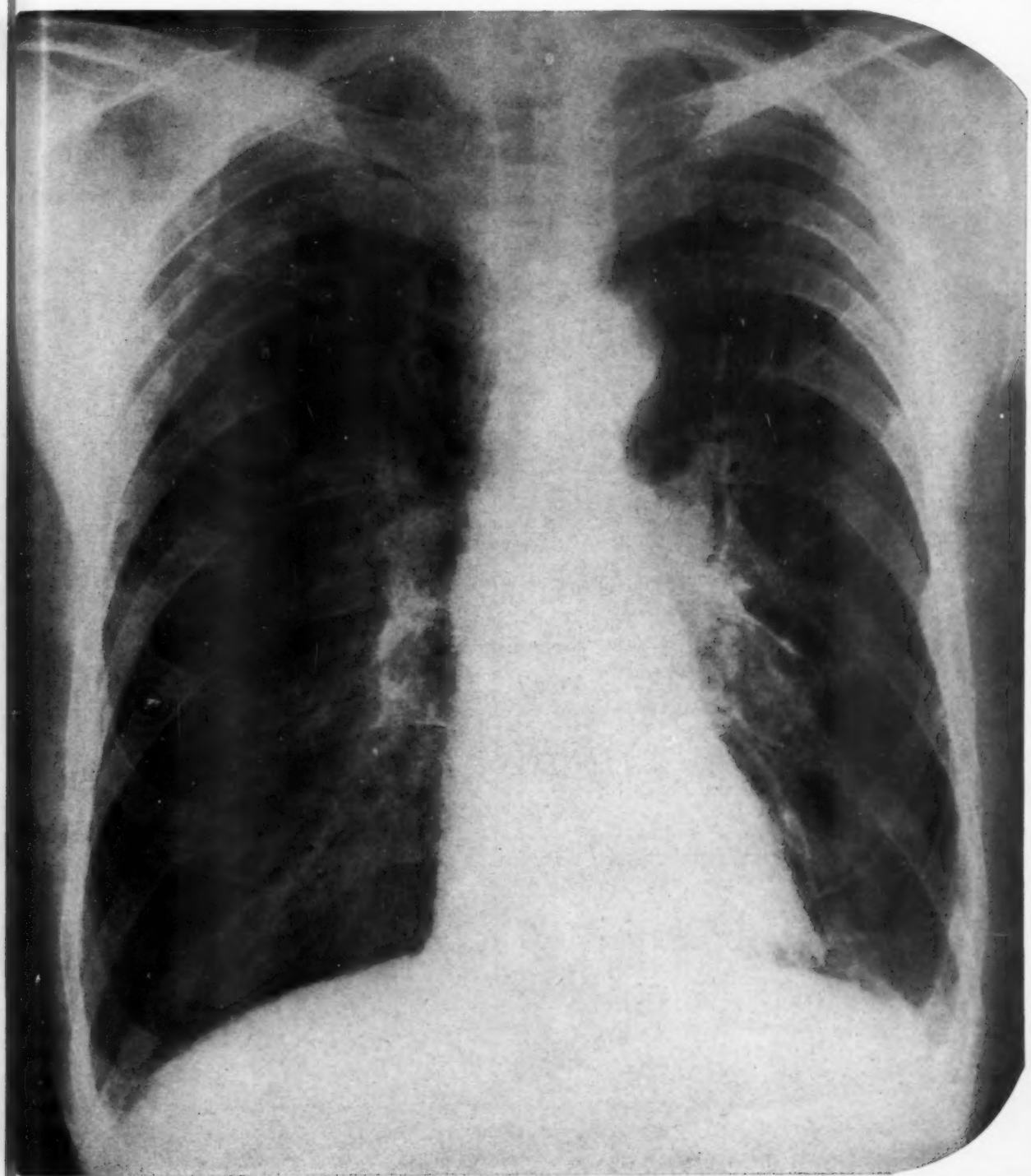
DERONIL™

dexamethasone

Schering

steroid potential confirmed and fully realized in bronchial asthma

5-413



ALCOHOLISM

A hospital equipped and staffed for the accommodation of those patients in whom over indulgence in alcoholic beverages has created a problem.

OPEN STAFF to members of the Arizona Medical Association.

POLLEN FREE REFRIGERATED AIR CONDITIONING FOR YEAR ROUND COMFORT

The Franklin Hospital

Hospital License No. 71
Registered A.M.A.
Member A.H.A.

367 No. 21st Avenue
PHOENIX, ARIZONA

Phone - Day or Night - AL 3-4751

HOBBY HORSE RANCH SCHOOL

A School For Exceptional Children

The Hobby Horse Ranch School is both home and school for a small group of children. It welcomes the child who is mentally retarded and physically handicapped as well as the backward child who suffers no physical handicap.

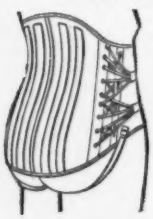
The Hobby Horse Ranch School is a branch of Fairview School in Fishkill, New York which was established in 1936.

Directors: Blanche C. Lightowler, B.A.
Matthew W. Lightowler

P.O.B. 44, Cortaro, Ariz.

DOCTOR:

We Invite Your Inspection Of Our New Larger Store at 49 W. THOMAS RD.



Grove's, (formerly at 3123 N. Central) now at 49 W. Thomas with plenty of free parking.

SUPPORTS, ELASTIC STOCKINGS, TRACTION EQUIPMENT, ETC. fitted exactly as you direct.

. . . for your patients' every condition — such as back strain, obesity, post-operative, cardiac, ptosis, whip-lash, etc.

Hospital and home calls made at your request.

Expert fitters, private fitting rooms.

GROVE'S
SURGICAL SUPPORTS
49 WEST THOMAS RD.
PHOENIX CR 4-5562

Equipment Is At Times No Better Than The Follow-up Service Needed.

WE SERVICE PROPERLY

surgical supply company

1030 E. McDowell Rd. — AL 4-5593

PHOENIX, ARIZONA

WAYLAND

PRESCRIPTION PHARMACIES

TWO FINE STORES

North Central Medical Bldg.

2021 N. Central

and

Professional Building

13 E. Monroe

Phoenix, Arizona

FREE DELIVERY

No more late billing...

All-Electric machine makes itemized statement in 4 seconds . . . right from your account cards

No more late billing when you send itemized statements made in just 4 seconds. With the new THERMO-FAX "Secretary" Copying Machine, your nurse or receptionist copies office account cards for only 2¢ per copy. This copy *is* the bill. You save time, simplify your billing . . . and your patients get the itemized statements they want. New All-Electric copy maker costs just $299*. Dry process eliminates chemicals or special installations.

*Suggested retail price.

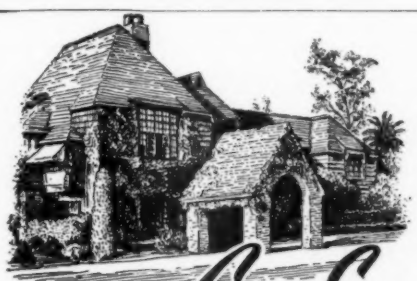
Thermo-Fax COPYING PRODUCTS

3M

The terms THERMO-FAX and SECRETARY are trademarks of Minnesota Mining & Mfg Co., St Paul 6, Minn. General Export: 99 Park Avenue, New York 16, N. Y. In Canada: P. O. Box 757, London, Ont.

HUGHES-CALIHAN CORPORATION

2508 N. Central — Phoenix, Arizona — CR 9-4166
417 E. 3rd St. — Tucson, Arizona — MA 4-4372



MUrray 1-9339

SYcamore 3-7193

2900 E. Del Mar Blvd.
(formerly Blanche Street)

Las Encinas

PASADENA, CALIFORNIA

LAS ENCINAS, sheltered in its own landscaped park, is conveniently located in Pasadena. Fully equipped for the clinical study, diagnosis and care of medical and emotional problems. Full-time staff of certified specialists in surgery, medicine and psychiatry. Rooms, apartments and suites available in main building or attractive cottages.

CHARLES W. THOMPSON, M.D., F.A.C.P., Medical Director

STAFF

CLIFTON H. BRIGGS, M.D., F.A.C.S.
ETHEL FANSON, M.D., F.A.C.P.
DOUGLAS R. DODGE, M.D.
HERBERT A. DUNCAN, M.D.
KENNETH P. NASH, M.D.
STEPHEN SMITH III, M.D.
HARRIET HULL SMITH, M.D.
JOHN W. LITTLE, M.D.
DONALD C. BALFOUR, JR., M.D.
GERTRUDE J. JACKSON, M.S., Psychology

WRITE FOR OUR ILLUSTRATED BOOKLET

PATHOLOGY

This is to announce that tissues for diagnosis are accepted by the following physicians who practice in Arizona, are not exclusively governmentally employed, and are qualified as pathologic anatomists:

J. D. BARGER, M.D.
338 E. Camelback Rd.
Phoenix, Arizona

RALPH H. FULLER, M.D.
1641 N. Tucson Blvd.
Tucson, Arizona

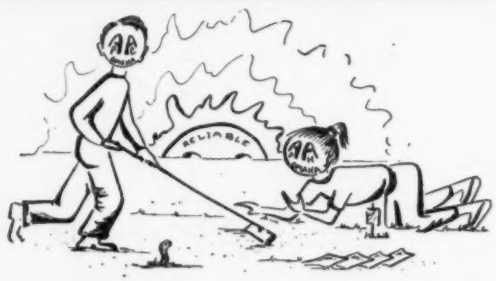
LOUIS HIRSCH, M.D.
1641 N. Tucson Blvd.
Tucson, Arizona

MAURICE ROSENTHAL, M.D.
Memorial Hospital
Phoenix, Arizona

GEORGE SCHARF, M.D.
2021 N. Central Avenue
Phoenix, Arizona

SEYMOUR B. SILVERMAN, M.D.
1130 E. McDowell Rd.
Phoenix, Arizona

JOSEPH J. LIKOS, M.D.
338 E. Camelback Rd.
Phoenix, Arizona



Protection Against Loss Of Income From Accident & Sickness As Well As Hospital Expense Benefits For You And All Your Eligible Dependents.

ALL PREMIUMS COME FROM — PHYSICIANS SURGEONS DENTISTS — ALL BENEFITS GO TO

PHYSICIANS CASUALTY & HEALTH ASSOCIATIONS
OMAHA 31, NEBRASKA
Since 1902

Handsome Professional Appointment Book sent to you FREE upon request.

P.A.F. CASE pH⁴

Douche Powder
For Refreshing Feminine Daintiness

℞

(FORTIFIED TRIPLE STRENGTH)

Buffered to control a normal vaginal pH.
The new, improved P.A.F. formula now includes — sodium lauryl sulfate and alkyl aryl sulfonate, providing high surface detergent activity in acid and alkaline media.
P.A.F.'s **low** surface **tension** increases penetration into the vaginal rugae and dissolution of organisms including trichmonas and fungus.
P.A.F.'s high surface activity liquifies viscus mucus on vaginal mucosa, releasing accumulated debris in the vaginal tract.
Non-irritating, non-staining, no offensive after-odor.

G. M. Case Laboratories
San Diego, California

ARIZONA STATE CHIROPODISTS ASSOCIATION

PHOENIX

Julius Citron, D.S.C., F.A.C.F.S.
40 E. Thomas Rd. — CR 9-4161

Daniel R. Nenard, D.S.C.
205 E. Camelback Road. — AM 5-7510

Samuel Mason, Pod. D.
461 W. Catalina Dr. — AM 6-1009

Howard B. Seyfert, Jr., D.S.C.
753 E. McDowell Rd. — AL 4-4414

Irwin D. Shapiro, D.S.C.
40 E. Thomas Rd. — CR 9-4161

TUCSON

Felton O. Gamble, D.S.C.
1888 N. Country Club Rd. — Phone EA 6-3212

Harold E. Mitton, D.S.C.
318 E. Congress St. — Phone MA 3-9151

Martin Snyder, D.S.C.
2629 E. Broadway — Phone EA 5-6333

LABORATORIES

RADIOLOGY

Douglas D. Gain, M.D. Diplomate American Board of Radiology

John W. Kennedy, M.D. Diplomate American Board of Radiology

James R. Matheson, M.D. Diplomate American Board of Radiology

Frank S. Tolone, M.D. Diplomate American Board of Radiology

ALpine 3-4131

NORTH CENTRAL MEDICAL LABORATORY

2021 North Central Avenue • Phoenix, Arizona

COMPLETE RADIOLOGICAL AND PATHOLOGICAL SERVICES

PATHOLOGY

AL 2-4993

Maurice Rosenthal, M.D. Diplomate American Board of Pathology

George Scharf, M.D. Diplomate American Board of Pathology

Seymour B. Silverman, M.D. Diplomate American Board of Pathology

NURSES' DIRECTORY

DISTRICT NO. 1

ARIZONA STATE NURSES ASS'N.

MRS. MARJORIE E. KASUN, R.N.
Registrar

Nurses' Professional Registry

703 Professional Bldg. — Phoenix — AL 4-4151

HILLCREST MEDICAL CENTER, INC.

Established 1921

- General Medical
- Orthopedic
- Post-Operative
- Acute or Chronic
- Convalescent
- Geriatric
- Medical Doctor of your choice
- Non-Sectarian

24 hr. Skilled Nursing — New, Modern Facilities

Phones: MA 4-1562 — MA 3-1391

1501 N. 3rd Avenue Tucson, Arizona

Alberta M. Lovett

Katharine Schmid Charles Schmid

BUTLERS REST HOME

- Bed Patients and Chronics
- Television
- 24 Hour Nursing Care
- Excellent Food
- State Licensed

802 N. 7th St. Phoenix, Arizona

Telephone AL 3-2592

DOCTORS' CENTRAL DIRECTORY

Helen M. Barrasso, R.N., Director

For Emergencies or in Absence of Your Doctor

CALL EA 5-1551

At Your Service 24 Hours Daily

3029 E. 2nd St. Tucson, Arizona

"Eastablished 1932"

LABORATORIES

THE DIAGNOSTIC LABORATORY

Complete Medical Laboratory Service, X-Ray Diagnosis
Radiation Therapy, Radioactive Isotopes

DEPARTMENT OF PATHOLOGY
MAURICE ROSENTHAL, M.D.
GEORGE SCHARF, M.D.
SEYMOUR B. SILVERMAN, M.D.

DEPARTMENT OF RADIOLOGY
MARCY L. SUSSMAN, M.D.
E. LAWRENCE GANTER, M.D.
W. RANSOM KELLEY, M.D.

Diplomates of the American Boards of PATHOLOGY and RADIOLOGY

1130 E. McDowell Rd. • Phoenix, Arizona

Phone AL 8-1601

Information, Price Lists and Mailing Containers upon request.

Medical Center X-Ray and Clinical Laboratory

1313 North 2nd Street
Phoenix, Arizona
Phone ALpine 8-3484

AND

Professional X-Ray and Clinical Laboratory

510 Professional Bldg.
Phoenix, Arizona
Phone ALpine 3-4105

DIAGNOSTIC X-RAY **X-RAY THERAPY**
RADIUM THERAPY
CLINICAL PATHOLOGY **TISSUE PATHOLOGY**
ELECTROCARDIOGRAPHY **BASAL METABOLISM**

R. Lee Foster, M.D., F.A.C.R., F.A.C.P., Director

Martin L. List, M.D., Radiologist *George A. Gentner, M.D., Radiologist*

Diplomates of American Board of Radiology

Lorel A. Stapley, M.D., Consultant Pathologist

PHYSICIANS' DIRECTORY

SURGERY

DONALD A. POLSON, MD., M. Sc.
GENERAL SURGERY
Certified by the American Board of Surgery
550 W. Thomas Road
Phone CRestwood 4-2081
Phoenix, Arizona

UROLOGY

ROBERT H. CUMMINGS, M.D.
Diplomate of the American
Board of Urology
Park Central Medical Bldg.
Phone CR 4-4912
550 W. Thomas Road — 230 Patio C
Phoenix, Arizona

PAUL L. SINGER, M.D., F.A.C.S.
Certified American Board of
UROLOGY
1313 N. Second Street Phone ALpine 3-1739
PHOENIX, ARIZONA

ALLERGY

E. A. GATTERDAM, M.D.
ALLERGY
15 E. Monroe St., Professional Bldg.
Office Hours: 11 A.M. to 5 P.M.
Phoenix, Arizona

SAM M. MACKOFF, M.D.
Allergy
Room 808 - Professional Building — 15 E. Monroe St.
Office: AL 2-0379 — Phoenix, Arizona

DANIEL H. GOODMAN, M.D., F.A.C.P.
Diplomate American Board of Internal Medicine
American College of Allergists
American Academy of Allergy
31 W. Camelback Road CR 7-3337
Phoenix, Arizona

HOWARD M. PURCELL, JR., M.D.
American Board of Pediatrics
American Academy of Pediatrics
American College of Allergists
ALLERGY OF CHILDREN
322 W. McDowell Rd. PHOENIX, ARIZONA

OBSTETRICS & GYNECOLOGY

ROY O. YOUNG, M.D., F.A.C.S.
Diplomate of the American Board of Obstetrics and Gynecology
110 West Birch Avenue
Flagstaff, Arizona
Phone: PRospect 4-4611

SPEECH PATHOLOGY

ROBERT N. PLUMMER, Ph.D.
SPEECH PATHOLOGIST
Advanced Member
American Speech and Hearing Association
Diagnoses Speech and Swallowing Therapy
240 W. Osborn Rd. Phone AM 5-0071
Phoenix, Arizona

MALIGNANT DISEASE

JAMES M. OVENS, M.D.
F.A.C.S .F.I.C.S.
Diplomate American Board of Surgery
Cancer and Tumor Surgery
X-ray and Radium Therapy
608 Professional Bldg. Phone ALpine 8-8074
Phoenix, Arizona

A L. LINDBERG, M.D.
Neoplastic Diseases
Tucson Tumor Clinic
721 N. 4th Ave., Tucson, Arizona
Phone MAin 3-2531

RADIOLOGY

R. LEE FOSTER, M.D., F.A.C.R., F.A.C.P.
MARTIN L. LIST, M.D., GEORGE A. GENTNER, M.D.
Diplomates of American Board of Radiology
Diagnostic Roentganology, X-Ray and Radium Therapy
510 Professional Bldg. 1313 N. Second St.
Phone ALpine 3-4105 Phone ALpine 8-3484
Phoenix, Arizona

MARCY L. SUSSMAN, M.D., F.A.C.R.
Diplomate of American Board of Radiology
E. LAWRENCE GANTER, M.D.
Diplomate of American Board of Radiology
DIAGNOSTIC RADIOLOGY
THERAPEUTIC RADIOLOGY
RADIOISOTOPES
1130 E. McDowell Rr.
Telephone ALpine 8-1601 Phoenix, Arizona

DOUGLAS D. GAIN, M.D.
JOHN W. KENNEDY, M.D.
JAMES R. MATHESON, M.D.
Diplomates of America Board of Radiology
X-Ray Therapy and Diagnosis
Radium Therapy
2021 N. Central Ave. .....AL 3-4131
Memorial Hospital .....AL 8-7531
1130 N. Central Ave. .....ALpine 8-8435

CLINIC DIRECTORY

THE ORTHOPEDIC CLINIC
Orthopedic Surgery
W. A. Bishop, Jr., M.D., F.A.C.S.*—A L. Swenson, M.D., F.A.C.S.*
Ray Fife, M.D.*—Sidney L. Stovall, M.D., F.A.C.S.*
Thomas H. Taber, Jr., M.D., F.A.C.S.*—J. N. Henrie, M.D.
*Diplomates of the American Board of Orthopedic Surgery
2620 N. 3rd St. CR 7-6211 Phoenix, Arizona

PHYSICIANS' DIRECTORY

EYE, EAR, NOSE and THROAT

JOHN J. McLOONE, M.D.
F.A.C.S. F.I.C.S.
Diplomate American Board of Otolaryngology
Park Central Medical Building
550 W. Thomas Rd. — 124-Patio C
Telephone CRestwood 4-3511
Phoenix, Arizona

ROY E. BURGESS, M.D.
Ophthalmology
Diplomate American Board of Ophthalmology
461 W. Catalina Dr. Suite 321
CR 7-8782 — Phoenix, Arizona

Plastic and Reconstructive Surgery

CLARE W. JOHNSON, M.D., F.A.C.S., F.I.C.S
Diplomate of the
American Board of Plastic Surgery
Park Central North — 461 W. Catalina Dr.
Phone CR 4-5713 — Phoenix, Arizona

DERMATOLOGY

GEORGE K. ROGERS, M.D.
DERMATOLOGY
Diplomate of American Board of
Dermatology and Syphilology
Phone ALpine 3-5264
105 W. McDowell Road Phoenix, Arizona

WILLIAM SNYDER, M.D.
Diplomate of the American Board of Dermatology
Diseases of the Skin
Skin Cancer — Cutaneous Allergy
2021 N. Central Ave. — ALpine 3-8383
PHOENIX, ARIZONA

SAM M. MACKOFF, M.D.
Diseases of the Skin
Room 808 - Professional Building — 15 E. Monroe St.
Office: AL 2-0379 — Phoenix, Arizona

GYNECOLOGY & ENDOCRINOLOGY

JOSEPH B. RADDIN, M.D.
Practice limited to
MEDICAL GYNECOLOGY & ENDOCRINOLOGY
706 Professional Building
15. E. Monroe — Phoenix, Arizona
Phone ALpine 2-3577

PSYCHIATRY and NEUROLOGY

JAMES M. KILGORE, JR, M.D.
Psychiatry
Park Central North Medical Building
CRestwood 9-9347
461 W. Catalina Drive Phoenix, Arizona

CARL BREITNER, M.D.
Psychiatry
AL 2-9108
1515 N. 9th St. Phoenix, Arizona

ORTHOPEDIC SURGERY

ROBERT E. HASTINGS, M.D., F.A.C.S.
ORTHOPAEDIC SURGERY
Diplomate American Board of Orthopaedic
Surgery
1014 N. Country Club
TUCSON, ARIZONA

PROCTOLOGY

WALLACE M. MEYER, M.D.
PROCTOLOGY
Park Central Medical Bldg.
Phone CR 4-5632
550 W. Thomas Road — 216 Patio B
Phoenix, Arizona

JAMES T. JENKINS, M.D.
Fellow American Proctologic Society
Fellow American College of Surgeons
Fellow International College of Surgeons
Practice Limited to Diseases of the Anus, Rectum
and Colon
2021 N. Central Ave.
Phoenix, Arizona — Phone AL 2-2822

SURGERY

DELBERT L. SECRIST, M.D., F.A.C.S.
123 South Stone Avenue
Tucson, Arizona
Office Phone MA 2-3371 Home Phone EA 5-9433

EDWARD L. KETTENBACH, M.D.
F.A.C.S., F.I.C.S.
SURGERY
Diplomate American Board of Surgery
2324 North Tucson Blvd Phone EA 5-2605
Tucson, Arizona

INDEX TO ADVERTISERS

Ames Company .....Inside Back Cover
Ayerst Laboratories 17A
Breon George & Company 2A
Bristol Laboratories 22A, 23A
Burroughs-Wellcome Company 24A
Butler Rest Home 61A
Camelback Hospital 33A
Camelback Professional Building 312
Case, G. M., Laboratories, Inc. 60A
Ciba Pharmaceutical Company 3A
Coca Cola Company 308
Endo Products Company 47A
Franklin Hospital 58A
Geigy Laboratories 14A, 300
General Electric Co., X-ray Dept. 16A
Glenbrook Laboratories 9A
Grove's Surgical Supports 58A
Grunow, Lois, Memorial Clinic 66A
Hillcrest Medical Center, Inc. 61A
Hobby Horse Ranch School 58A
Hughes-Calihan Corp. 59A
K. B. Surgical Supplies Co. 58A
Las Encinas Sanitorium 59A
Lederle Laboratories 10A, 11A, 25A, 34A, 272, 273, 56A
Lilly, Eli, & Company .....Front cover, 40A
Lorillard & Company 20A
MacAlpine Drugs 61A
Massengill, S. E., & Co. 28A
Medical Dairy Products Co. 6A
Medical & Dental Finance Bureau 288
Merck, Sharp & Dohme 4A, 29A, 48A
National Casualty Co. 8A
Nurses' Directory 61A
Parke Davis & Co. .....Inside front cover, 1A
Physicians' Casualty Co. 60A
Robins, A. H., & Co. 46A
Roerig, J. B., Laboratories 35A, 298, 49A
Ryan-Evans Drugs 8A
Sardeau Laboratories 299
Schering Corporation....26A, 27A, 39A, 45A, 57A
Searle, G. D., & Co. 282
Smith Dorsey Co. 19A, 30A, 31A
Smith, Kline & French Laboratories..Back Cover
Squibb, E. R., & Sons Co. 18A, 38A
Testagar Company, Inc. 15A
Wallace Laboratories ..36A, 37A, 53A, 54A, 55A
Wayland Drugs 59A
Wesson Oil & Snowdrift Sales Co.....12A, 13A
Winthrop Laboratories.21A, 32A, 301, 302, 303, 304

PHARMACY DIRECTORY

MODERN RX PHARMACY
TELEPHONE 20
NOGALES ARIZONA

LAIRD & DINES
The REXALL Store
Reliable Prescription Service
WOodland 7-2922 Mill Ave. & 5th
Tempe, Arizona

Your Prescription Store
DIERDORF PHARMACY
Phone BR 5-5212
2315 N. 24th St. Phoenix, Arizona
Milburn F. Dierdorf

In Scottsdale call
Lute's Scottsdale Pharmacy
For
PRESCRIPTIONS
WH 5-8420 — WH 5-8429
Next to the 1st National Bank

ŚRUTWA PHARMACY
4234 E. Indian School Road
PHOENIX, ARIZONA
Phone CRestwood 7-7605
P. C. Śrutwa, R. Ph. G.

SCOTTSDALE MEDICAL CENTER PHARMACY
218 E. Stetson Drive
SCOTTSDALE, ARIZONA
WH 5-3791
Cas. H. Śrutwa, B. Sc.

CLASSIFIED

FOR SALE:

A well established general practice in the City of Prescott, excellently located with a long lease and abundant parking facilities, now available. Waiting room furnishings, new drapes, steel desks, examining tables, filing cabinets, binocular microscope and other equipment **only** for sale at a reasonable price and well below actual cost. All records included. Retiring on account of health.

Contact, C. F. Blackler, M.D., 108 N. Summit, Prescott, Arizona.

PHARMACIST

Experienced in retail and hospital pharmacy, desires to contact group of doctors with view of establishing pharmacy in clinic. Replies kept in strict confidence. Box E-102. Ariz. Med.

LOCUM TENENS WORK WANTED

OB-GYN specialist; Board member; wishes to work locum tenens for private doctor or clinic during July 1960. Irving Siegel, M.D., 5054 N. St. Louis Ave., Chicago 25, Ill.

LOIS GRUNOW MEMORIAL BUILDING

McDOWELL AT TENTH STREET PHOENIX, ARIZONA

OPTHALMOLOGY
John S. Aiello, M.D.

GENERAL SURGERY
H. G. Williams, M.D., F.A.C.S.
David C. James, M.D.

INTERNAL MEDICINE
Hilton J. McKeown, M.D., F.A.C.P.
C. Selby Mills, M.D., F.A.C.P.
S. Kent Conner, M.D.
Thomas A. Edwards, M.D.
John F. Westfall, M.D.

PEDIATRICS
Robert W. Ripley, M.D.

DERMATOLOGY
Helen M. Roberts, M.D.

CARDIOVASCULAR MEDICINE
Thurl E. Andrews, M.D.

UROLOGY
M. L. Day, M.D., F.A.C.S.

OBSTETRICS and GYNECOLOGY
Clarence B. Warrenburg, M.D.
William E. Crisp, M.D.

GENERAL DENTISTRY
George F. Busch, D.D.S.

OTOLARYNGOLOGY
D. E. Brinkerhoff, M.D., F.A.C.S.
V. A. Dunham, Jr., M.D.

NEUROSURGERY
John A. Eisenbeiss, M.D., F.A.C.S.
William B. Helme, M.D.

PSYCHIATRY and NEUROLOGY
Maier I. Tuchler, M.D.

LABORATORIES
Director—Thomas A. Hartgraves, M.D., F.A.C.R.
Associate Radiologist—Don E. Matthiesen, M.D.
Associate Pathologist—O. O. Williams, M.D., F.A.C.P.

New building addition planned for immediate construction. Inquiries from prospective tenants invited for discussion of suite arrangements and leases. Call Lois Grunow, Building Office, AL 2-0494.

AN AMES CLINIQUICK®

CLINICAL BRIEFS FOR MODERN PRACTICE

WHY IS DIABETES IN INFANTS SO DIFFICULT TO DIAGNOSE?

Because of the infrequency of the disease in this age group, its sudden onset, the profusion of inconsistent presenting symptoms, and because the accompanying symptoms of anorexia and vomiting are also characteristic symptoms of many other ills of infancy.

*Source: Traisman, H. S.; Boehm, J. J., and Newcomb, A. L.: Diabetes *8*:289, 1959.

for those pediatric puzzlers..."A routine urinalysis and blood sugar should be done whenever the possibility of diagnosing diabetes is entertained."*

the standardized urine-sugar test for reliable quantitative estimations

AMES COMPANY, INC. Elkhart, Indiana Toronto, Canada

COLOR-CALIBRATED CLINITEST®

BRAND Reagent Tablets

84080

DIABETES MELLITUS AT AGES 1 TO 5

Order of Frequency of Presenting Symptoms in 110 Patients

Symptoms	No. of Patients	Per cent of total group
Polyuria	93	84.5
Polydipsia	89	81.0
Weight loss	47	42.7
Polyphagia	28	25.4
Anorexia	16	14.5
Lethargy	14	12.7
Enuresis	7	6.4
Vomiting	5	4.5
Irritability	3	2.7
"Craving for sweets"	3	2.7
"Sticky diaper"	3	2.7
"Strong odor to urine"	2	1.8
Glycosuria	2	1.8
Hypoglycemia	2	1.8
Personality change	1	0.9
Boils	1	0.9
Headache	1	0.9
Abdominal cramps	1	0.9

Adapted from Traisman, H. S.; Boehm, J. J., and Newcomb, A. L.*

- **full-color calibration, clear-cut color changes**
- **established "plus" system covers entire critical range**
- **standard blue-to-orange spectrum**
- **standardized, laboratory-controlled color scale**
- **"urine-sugar profile" graph for closer control**

Journal S. C. Med. Ass'n.
Editor
Florence, S. C.

IN ANXIETY—RELAXATION RATHER THAN DROWSINESS

STELAZINE®

brand of trifluoperazine

'Stelazine' has little if any soporific effect. "... patients who reported drowsiness as a side effect mentioned that they did not fall asleep when they lay down for a daytime nap. It is quite possible that, in some instances, 'drowsiness' was confused with unfamiliar feelings of relaxation."[1]

Available for use in everyday practice: Tablets, 1 mg., in bottles of 50 and 500; and 2 mg., in bottles of 50.

N.B.: For information on dosage, side effects, cautions and contraindications, see available comprehensive literature, PDR, or your S.K.F. representative.

1. Goddard, E.S.: in *Trifluoperazine, Further Clinical and Laboratory Studies*, Philadelphia, Lea & Febiger, 1959.

SMITH KLINE & FRENCH

leaders in psychopharmaceutical research